

## **4.3 LAND EXCHANGE**

### **4.3.1 Land Use**

The federal and non-federal lands were reviewed against parameters similar to the Mine Site and Plant Site, including existing land use plans, zoning designations, public access routes, mineral ownership and economic potential, and title.

Additionally, each tract of the Land Exchange Proposed Action was evaluated for the presence of known existing hazardous material effects and contaminated sites and for the potential for hazardous materials to currently affect the lands. Research to evaluate potential hazardous materials or hazardous material sites on these land areas consisted of review of three types of data sources, depending on the size and geographic spread of the land area. The data sources used include:

- An ASTM/AIA Phase I ESA;
- An Environmental Regulatory Database search, which was conducted by Environmental Data Resources, Inc. (EDR), and consists of a report of federal, state, local, or tribal agency databases; and
- The MPCA website database titled, “What’s In My Neighborhood?”

A Phase I ESA provides a comprehensive review of environmental regulatory databases and includes a physical site visit, interviews with property or adjacent property owners and local officials, and review of historical data such as aerial photographs, topographic maps, fire insurance maps, land title records, or property tax files. Conclusions are drawn based upon the findings to identify recognized environmental conditions based on the comprehensive review and the opinion of the environmental professional.

The Environmental Regulatory Database search defines and summarizes the ASTM databases reviewed in the EDR report and notes whether any sites (including the target property) were identified within a specified search radius. The database sites identified in the EDR report were evaluated with respect to the target land area to determine which sites indicate hazardous material effects.

The MPCA website database identifies potentially contaminated sites through a searchable inventory of properties, as well as sites that have already been cleaned up and those currently being investigated or cleaned up. The website also contains a searchable inventory of businesses that have applied for and received different types of environmental permits and registrations from the MPCA.

#### **4.3.1.1 Federal Lands**

##### **4.3.1.1.1 Land Exchange Proposed Action**

The boundaries of the federal lands include the Mine Site, as well as land to the north and west, but exclude the privately owned land bordering Dunka Road to the south of the Mine Site. Section 4.2.1.2 provides a discussion of the existing land use on the federal lands.

The Land Exchange Proposed Action includes 6,495.4 acres of federal lands with a perimeter of approximately 23 linear miles. By comparison, Superior National Forest comprises 4,600,831.8 acres, of which 2,171,603.9 acres, with a perimeter of 10,054.8 linear miles (including the federal lands), are managed by the USFS (there are lands within the Superior National Forest boundaries owned by the State, counties, and private owners). The majority of the federal lands are within the General Forest – Longer Rotation Management Area, while the remainder is within the General Forest Management Area (see Figure 4.3.1-1). These management areas are defined in Section 4.2.1.2. Table 4.3.1-1 summarizes the acreage of the federal lands, by management area, for the Land Exchange Proposed Action.

There is no known existing contamination by hazardous materials in the federal lands.

**Table 4.3.1-1 Management Area Designations for the Federal Lands under the Land Exchange Proposed Action**

Management Area Designation	Total Acreage
General Forest – Longer Rotation	6,140.1
General Forest	355.3

#### **4.3.1.1.2 Land Exchange Alternative B**

Under the Land Exchange Alternative B, 4,752.6 acres of federal lands would be exchanged for the 4,926.3-acre Tract 1. Table 4.3.1-2 summarizes the acreage of the federal lands, by management area, for the Land Exchange Alternative B. Section 4.3.1.2.1 describes Tract 1.

**Table 4.3.1-2 Management Area Designations for the Federal Lands under Land Exchange Alternative B**

Management Area Designation	Total Acreage
General Forest – Longer Rotation	4,397.3
General Forest	355.3

#### **4.3.1.2 Non-federal Lands**

The non-federal lands comprise five tracts—each consisting of one or more individual parcels—totaling 7,075.0 acres. The land use conditions of each tract are described below. Tracts 1 and 2 of the Land Exchange Proposed Action include areas with potential conservation value (i.e., cRNA Management Area and Riparian Emphasis Management Area). Some of the parcels within Tract 2, Tract 3, and Tract 4 have limited accessibility by either road or foot trail, although there are segments that show evidence of timber harvesting (see Figures 5.3.1-1 and 5.3.1-2).

##### **4.3.1.2.1 Tract 1 – Hay Lake Lands**

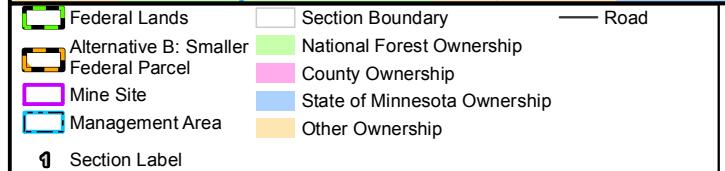
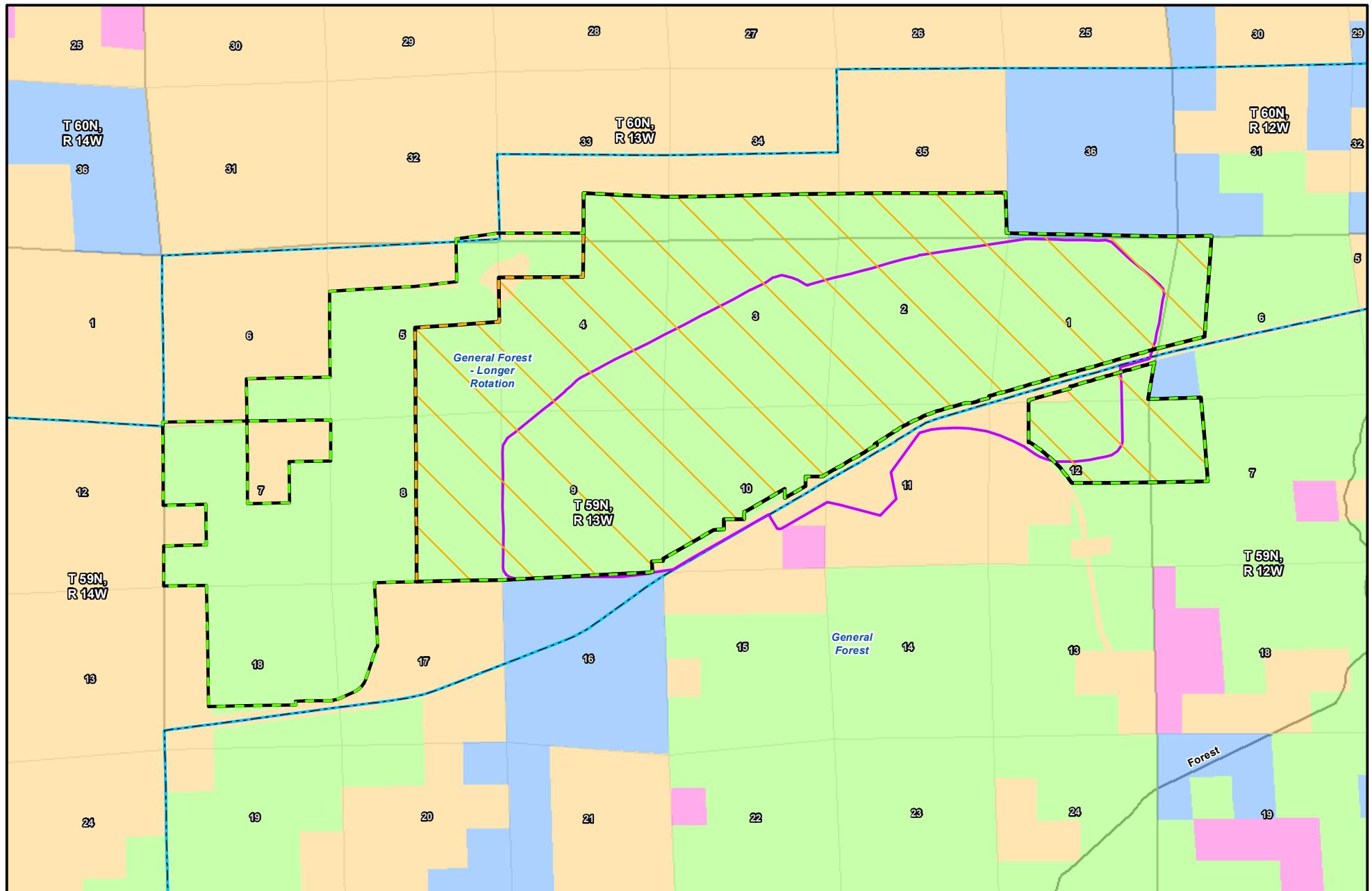
Tract 1 is located in central St. Louis County, approximately 3 miles north-northwest of the City of Biwabik. The tract consists of one parcel covering approximately 4,926.3 acres, with a perimeter of approximately 15 linear miles.

### **Land Use Regulation**

Land use in Tract 1 is governed by the St. Louis County zoning ordinance. It is divided among the following zoning districts (St. Louis County 2011):

- **Forest Agricultural Management (FAM-1):** This district recognizes and promotes the development of forestry and agricultural industry and encourages recreational activity. It is typically applied to areas with very low density land development. This district is located in the northeast corner and occupies approximately 5 percent of the Tract 1 lands.
- **Forest Agricultural Management (FAM-2):** This district recognizes and promotes the development of forestry and agricultural industry and encourages recreational activity. It is typically applied to areas with very low density land development. Whereas FAM-1 has a minimum parcel size of at least 35 acres, FAM-2 has a minimum parcel size of 17 acres. This district is located throughout the parcel and occupies approximately 57 percent of the Tract 1 lands.
- **Sensitive Areas (SENS-3):** In addition to the forestry/agriculture focus embodied in the FAM-2 district, the SENS-3 district also recognizes significant areas that are unsuitable for intensive development due to the potential for environmental hazards or other features to negatively affect environmental conditions. This classification surrounds most of Hay Lake and Little Rice Lake, as well as a large portion of the river and riparian areas. This district is located throughout the parcel and occupies approximately 33 percent of the Tract 1 lands.
- **Residential (RES-3):** This district recognizes and promotes residential development with limited non-residential uses. This district is located northeast and southwest of Hay Lake and occupies approximately 5 percent of the Tract 1 lands.

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**Figure 4.3.1-1**  
**Ownership of Federal Lands**  
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Adjacent to Tract 1 on the west and north are Superior National Forest lands that fall within the General Forest Management Area. Two cRNA management areas adjoin the tract: Pike Mountain on the southwest corner and Loka Lake on the northeast corner (USFS 2011b). The cRNAs are designated by the USFS for the purpose of preserving and maintaining areas for ecological research, observation, genetic conservation, monitoring, and educational activities. No recreation facilities are provided in these management areas; while dispersed recreation occurs (see Section 4.3.11.2.4), it is generally discouraged. The Pike Mountain cRNA is characterized by a hardwoods forest plant community. The Loka Lake cRNA is characterized by high-quality lowland black spruce and tamarack swamp (USFS 2011h).

Adjacent to Tract 1 to the south and east are privately owned lands within St. Louis County's Multiple Use Non-Shoreland 4 (MUNS-4) zoning district. This designation allows for a diverse array of development, such as residential, light industry, commercial, livestock, sanitary landfill, airport, and utility facilities, among others (St. Louis County 2011).

As part of the Land Exchange Proposed Action, the non-federal lands were the subject of Phase I ESAs. Potential areas of legacy contamination were discovered on Tract 1. These areas were investigated and remediated through removal and disposal of potentially contaminated soil and materials. Any remnant contamination (limited to two instances where less than 5 gallons of used oil were spilled) is expected to degrade in situ (NTS 2011).

### **Existing Land Use**

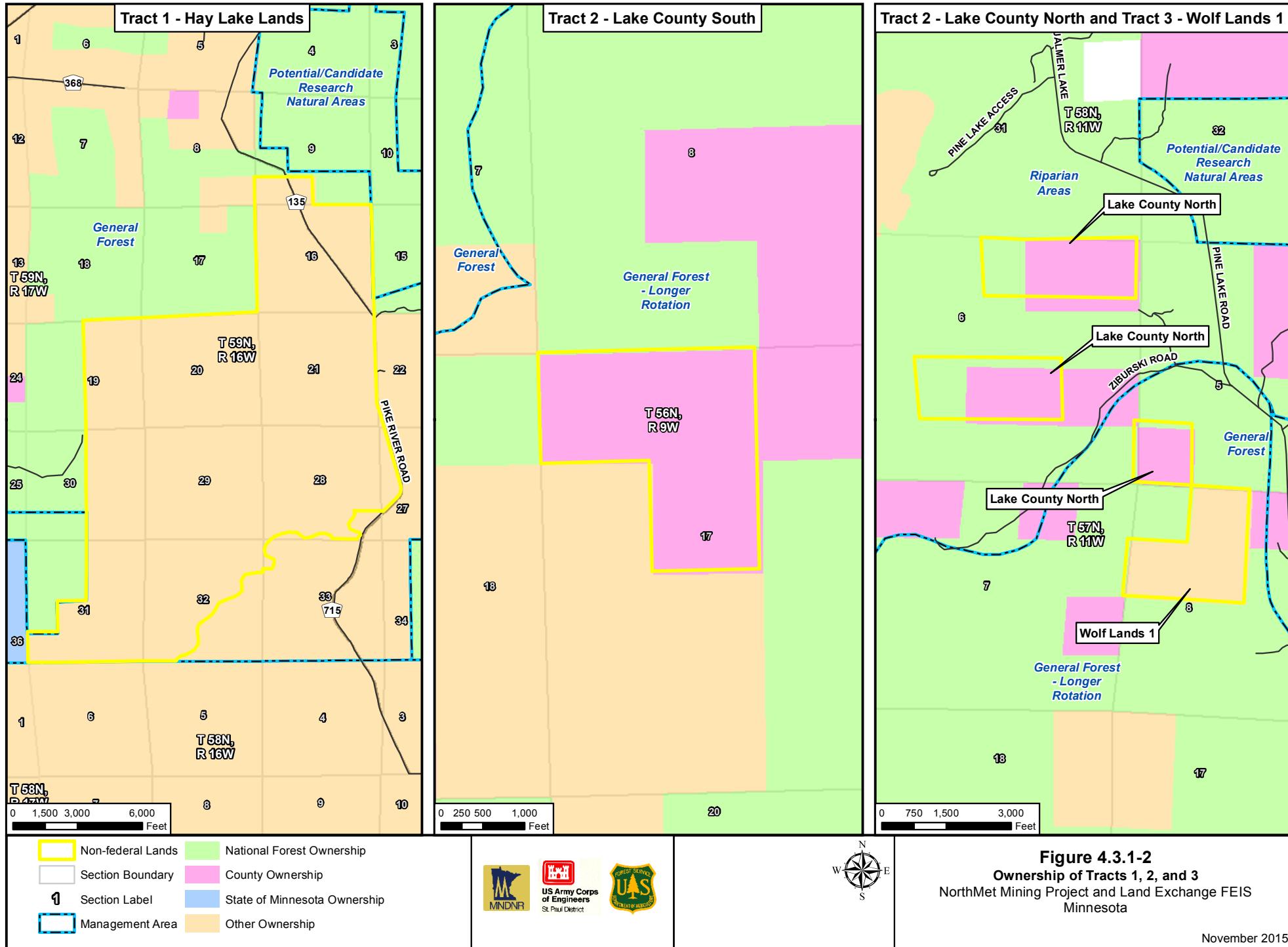
Tract 1 includes Hay Lake, identified as a wild rice water by the MDNR, Little Rice Lake, and an unnamed lake (see Figure 4.3.1-2). Approximately eight miles of the upper Pike River flow through Tract 1. An electrical transmission line crosses Sections 19, 20, 21, and a portion of Section 16 (USFS 2011b). CR 715 forms part of the eastern boundary of the tract.

A small boat landing and primitive parking area provide access to the Pike River adjacent to CR 715. Several trails also emanate from CR 715, some with bridges crossing the upper Pike River; all of these trails are gated or bermed. There is evidence that a sand/gravel pit near CR 715 has been used as a dumping site in the recent past, but has been fully remediated and cleared of trash and debris (NTS 2011). The gravel pit area is gated, but there is evidence that it has been used as a shooting range. There are also numerous deer stands on the parcel (Lisson and Gawtry 2011).

### **Property Rights, Title, and Mineral Resources**

PolyMet currently owns surface rights to Tract 1. The tract is subject to a mortgage in favor of Iron Range Resources, which would be satisfied at closing of the Land Exchange Proposed Action (USFS 2011c). Title to this parcel has been reviewed and approved by the USDA Office of General Counsel so long as certain recommended affirmative title insurance is provided (USFS 2011c).

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Tract 1 was assessed for mineral resource potential as part of the Feasibility Analysis completed in 2009 (USFS 2009c). The geology of the area is mostly granitic rocks with the southwestern-most part underlain by metamorphosed basalts, gabbros, and sedimentary rocks. The mineral potential for the tract was determined to be limited, as granitic rocks are not known to host mineral deposits. The MDNR core library index showed no drilling on or near Tract 1. Additional investigation in 2011 indicates potential for aggregate production from the northeastern corner of the tract along the Pike River. Tract 1 appears to have a low potential for exploration or development of bedrock or surficial deposits (Barr 2011c).

### **Legacy Pollution**

The legacy pollution data review described in Section 4.3.1 found that hazardous materials may be present on Tract 1, specifically along Pike River Drive in the northeastern portion of the tract, and between Hay Lake and CR 715, west of the Pike River. The Phase I ESA for Tract 1 described several areas where releases of hazardous materials may exist due to unauthorized dumping. The EDR report and MPCA database also identified three unauthorized or unpermitted dump sites on Tract 1. The southernmost dump, west of the Pike River, is named Unauthorized Dump-Biwabik. The two remaining dump sites, Unauthorized Dump-2 and Unnamed Dump-Biwabik/2, are north of the first dump site and adjacent to CR 715. These types of dumps are typically old farm, homestead, or municipal disposal sites that accepted household waste. There are no records of inspection or enforcement actions at these sites in the MPCA database (NTS 2010a; EDR 2009a; MPCA 2012d); however, a subsequent Phase II investigation found no evidence of spills or contamination, and found that legacy pollution had been resolved at the site (NTS 2011).

#### **4.3.1.2.2 Tract 2 - Lake County Lands**

Tract 2 comprises four parcels in Lake County, southeast of Seven Beaver Lake, totaling 381.9 acres with a perimeter of approximately 7 linear miles. No hazardous material issues were identified at Tract 2 (EDR 2011a; EDR 2011b; MPCA 2012d).

### **Land Use Regulation**

All Lake County parcels fall within Lake County's Forest-Recreation zoning district (ERM, Pers. Comm., October 10, 2011). The Forest-Recreation district provides for remote residential development distant from public services. It is intended to prevent the destruction of natural or man-made resources, maintain large tracts for forest recreation purposes, provide for the continuation of forest management and production programs, and foster recreational uses and other compatible activities.

The Lake County North parcels are surrounded by land within two Superior National Forest Management Areas (see Figure 4.3.1-2): the General Forest – Longer Rotation Management Area (see Section 4.2.1.2) and the Riparian Emphasis Area Management Area. Lands in the Riparian Emphasis Area are located along rivers and lakes that receive moderate to low levels of recreation use. This designation promotes the restoration, protection, and enhancement of areas sensitive to degradation. Lands surrounding Seven Beaver Lake and adjacent to Tract 2 are the headwaters area of the St. Louis River, and are designated as a Riparian Emphasis Area Management Area.

The Lake County South parcel is largely bordered by lands in the General Forest – Longer Rotation Management Area. Adjacent parcels to the southwest are privately owned land; parcels to the northeast are county land in the Forest-Recreation zoning district.

### **Existing Land Use**

A trail provides access to the Lake County North parcels, but access to the trail is relatively difficult (Lisson and Gawtry 2011). There is evidence of clearcut timber activity on the Lake County North parcels.

There is limited access to the Lake County South parcel due to wetlands and private land restrictions, and little evidence of active use (Lisson and Gawtry 2011).

### **Property Rights, Title, and Mineral Resources**

Tract 2 parcels are tax forfeit lands that are being purchased in the name of Lake-Forest Enterprise, Inc. on a land contract from Lake County. An assignment on file with Andresen and Butterworth, PA assigns all right, title, and interest in these lands to PolyMet (USFS 2011c).

A review of mineral resources on Tract 2 indicates a low potential for exploration or development of bedrock or surficial deposits (Barr 2011c). A title commitment review found that one 40-acre parcel has one-half mineral interest outstanding and that all other minerals will be reserved by the State of Minnesota and subject to the Secretary's Rules and Regulations. Within the Lake County South parcel, one 40-acre parcel is subject to mineral reservation that includes the right to sink, cave, disturb, or remove surface material. Another parcel has one-half outstanding mineral interest with the right to remove but “doing no injury to the surface or else paying for damages.” The third and final 40-acre parcel and the remaining one-half mineral interest would be reserved by the State of Minnesota and would be subject to the Secretary's Rules and Regulations (USFS 2011c).

#### **4.3.1.2.3 Tract 3 – Wolf Lands**

The Wolf Lands consist of four separate parcels in Lake County totaling 1,575.8 acres with a perimeter of approximately 14 linear miles. No hazardous material issues were identified at Tract 3 (EDR 2011b; EDR 2011c; EDR 2011d; EDR 2011e; MPCA 2012d).

### **Land Use Regulation**

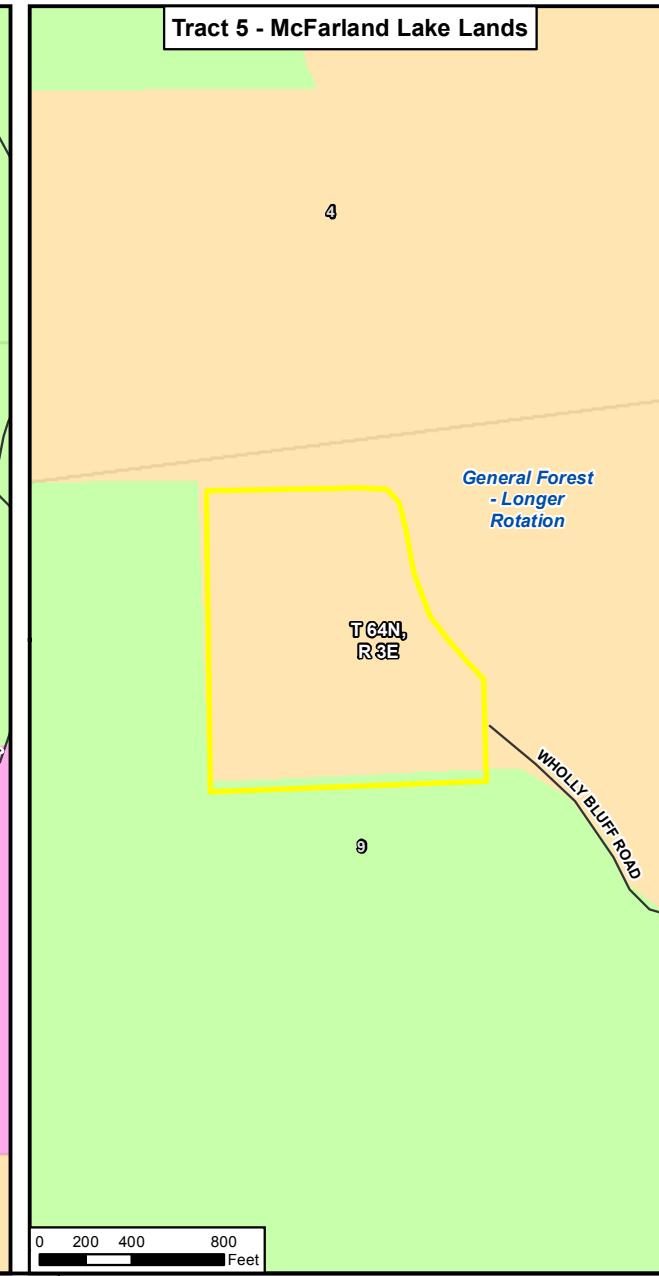
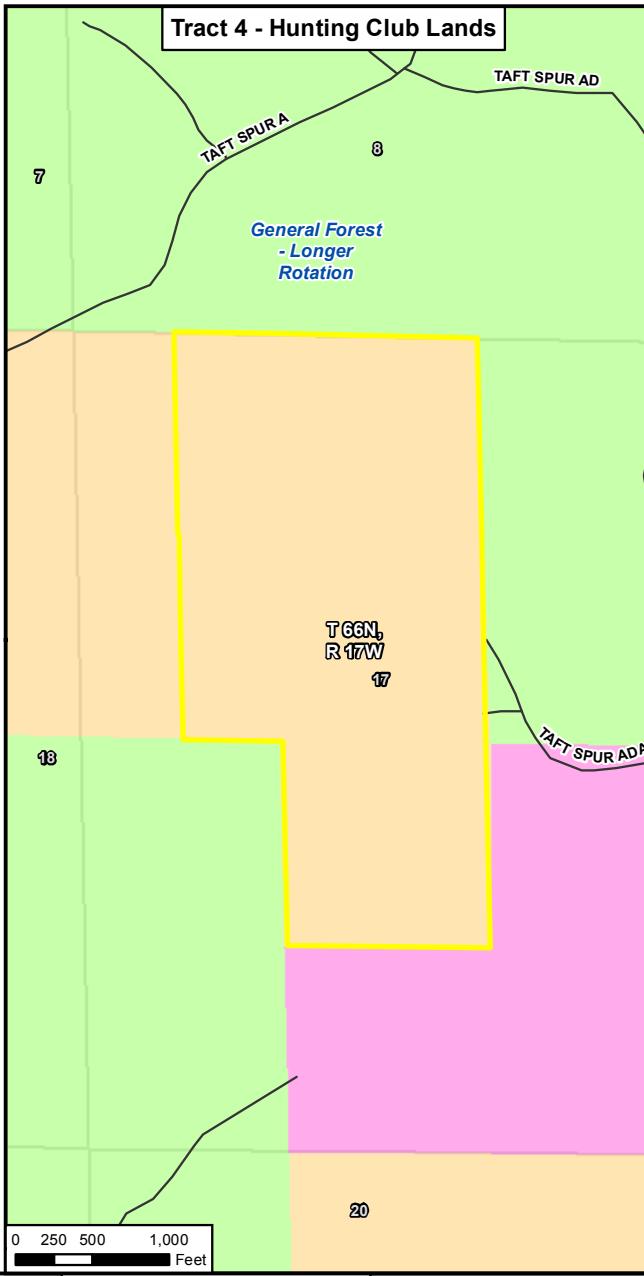
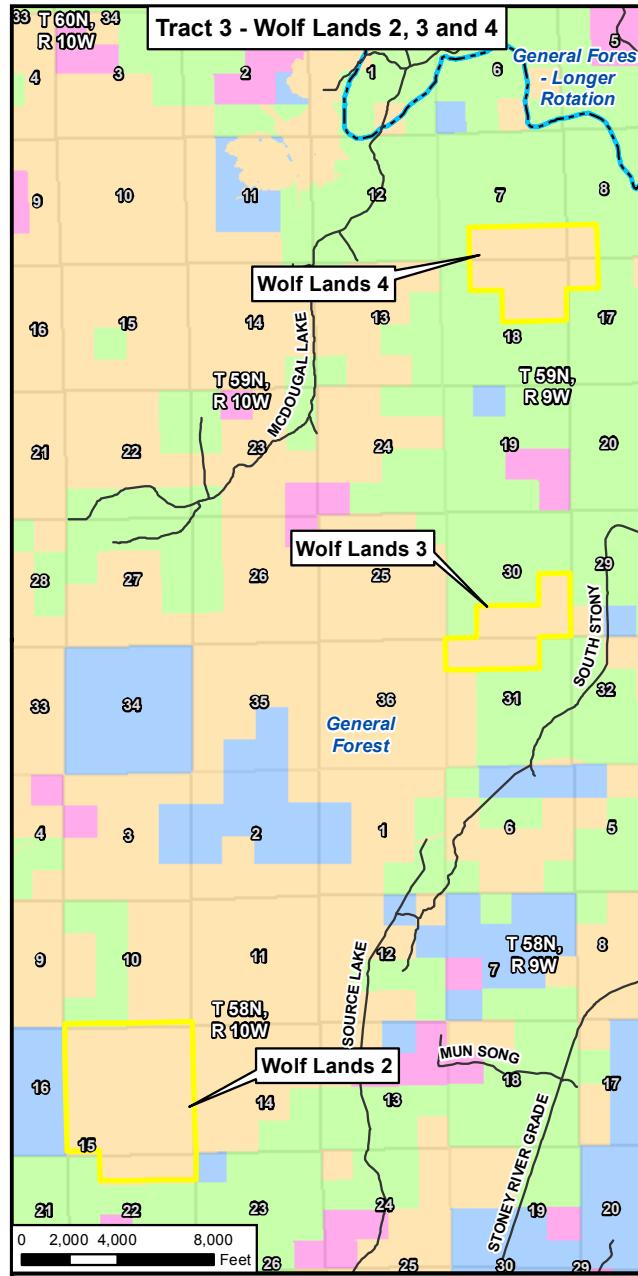
All Tract 3 parcels are within Lake County's Forest-Recreation zoning district, defined in Section 4.3.1.2.3 (ERM, Pers. Comm., October 10, 2011).

Wolf Lands 1, the southernmost parcel, is largely bordered by Superior National Forest land in the General Forest-Longer Rotation Management Area. Adjacent parcels to the southwestern and northeastern corners owned by Lake County are also within the Forest-Recreation district (see Figure 4.3.1-2).

Wolf Lands 2 is bordered to the north and south by Superior National Forest land in the General Forest Management Area. Adjacent parcels to the east are privately owned, in Lake County's Forest-Recreation district. Adjacent parcels to the west and southeast are state-owned land (see Figure 4.3.1-3).

Wolf Lands 3 is adjacent to Superior National Forest land in the General Forest Management Area. Small privately owned parcels to the east and west are within Lake County's Forest-Recreation district (see Figure 4.3.1-3). A timber harvest agreement currently encumbers parts of this parcel (USFS 2011c).

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- Non-federal Lands
  - National Forest Ownership
  - County Ownership
  - State of Minnesota Ownership
  - Other Ownership
- Section Boundary
- 1 Section Label
- Management Area



US Army Corps of Engineers  
St. Paul District



**Figure 4.3.1-3**  
**Ownership of Tracts 3, 4, and 5**  
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Wolf Lands 4 is surrounded by Superior National Forest land in the General Forest Management Area (see Figure 4.3.1-3).

#### **Existing Land Use**

Access to Wolf Lands 1 and 2 is limited by the distance from roads and the presence of wetlands surrounding Wolf Lands 2. There is no evidence of any active land use on either of these parcels (Lisson and Gawtry 2011).

Wolf Lands 3 is accessible from a trail off of Forest Road 393. There is evidence of ongoing timber harvesting on this parcel (Lisson and Gawtry 2011).

Wolf Lands 4 is accessible via overland hiking from Forest Road 106, but there is no evidence of active land use (Lisson and Gawtry 2011).

#### **Property Rights, Title, and Mineral Resources**

Tract 3 is being purchased in the name of Lake-Forest Enterprise, Inc., through options from Wolf Lands, Inc. An assignment on file with Andersen and Butterworth, PA assigns all right, title, and interest in these lands to PolyMet (USFS 2011c).

There appears to be low potential for exploration or development of bedrock or surficial deposits on the Wolf Lands parcels. There is a moderate potential for aggregate development within Wolf Lands 2, but the parcel's wetland areas and limited access may restrict this opportunity (Barr 2011c).

Within Wolf Lands 1, there is an undivided three-quarter mineral interest reserved by Anton T. Anderson; all remaining mineral interests are held by Kimberly Clark with the right to cave, disturb, damage, or remove the surface while accepting liability for surface damage. The title commitment review indicated that this represents a poor condition of title but may be immaterial because the mineral development potential is low. In addition, there is no timber reservation or agreement in place (USFS 2011c).

Within Wolf Lands 2, 3, and 4, mineral interests are reserved by Duluth & Iron Range Railroad Co. along with the right to sink, cave, disturb, and remove the surface. The title commitment review indicated that this represents a poor condition of title that may be immaterial because the mineral development potential is low.

There are no active timber reservations or agreements in place for the Wolf Lands parcels.

#### **4.3.1.2.4 Tract 4 – Hunting Club Lands**

Tract 4 is a single parcel southwest of Crane Lake in St. Louis County. It is composed of 160.0 acres, with a perimeter of approximately 2 linear miles. No hazardous material issues were identified at Tract 4 (EDR 2011f; MPCA 2012d).

### **Land Use Regulation**

Tract 4 is within St. Louis County's Forest Agricultural Management (FAM-1) zoning district. This district is intended to promote the forestry and agricultural industries, as well as recreational uses (St. Louis County 2011). Adjacent parcels on the west and southeast are also in this county zoning district. Adjacent parcels to the southwest, north, and east are Superior National Forest lands in the General Forest—Longer Rotation Management Area (see Figure 4.3.1-3).

### **Existing Land Use**

Tract 4 is accessible by trail from a gravel road northwest of the property. The tract includes portions of two small unnamed lakes. There is no evidence of active land use.

### **Property Rights, Title, and Mineral Resources**

There is low potential for exploration or development of bedrock or surficial deposits within Tract 4 (Barr 2011c). The only title exception is the property's enrollment in the Sustainable Forest Incentive Act Covenant dated September 3, 2002. This status normally includes an 8-year commitment for enrollment (USFS 2011c). The Sustainable Forest Incentive Act Covenant still applies to Tract 4 according to the updated Commitment for Title Insurance for this parcel. The covenant means the property is not and will not be:

- Used for residential purposes;
- Used for agricultural purposes;
- Enrolled in the Reinvest in Minnesota program or in a state or federal conservation reserve or easement reserve program;
- Enrolled in the Minnesota Agricultural Property Tax Law;
- Subject to agricultural land preservation controls or restrictions or the Metropolitan Agricultural Preserves Act; or
- Improved with a structure, pavement, sewer, permanent campsite, or any road (other than a township road), that are used for purposes not prescribed in the forest management plan for the property.

This covenant may need to be extinguished in order for the United States to accept title. The acceptability of the covenant will be determined by the USDA, Office of General Counsel, if a decision is made to proceed with the Land Exchange Proposed Action.

#### **4.3.1.2.5 Tract 5 – McFarland Lake Lands**

Tract 5 is a single parcel approximately 3 miles from the US-Canada border in Cook County. It covers approximately 30.8 acres, with a perimeter of approximately one linear mile. No hazardous material issues were identified on Tract 5 (NTS 2010b; EDR 2009b; MPCA 2012d).

### **Land Use Regulation**

Tract 5 is in an unincorporated area in Cook County's Forest/Agriculture Residential (FAR 2) zoning district. This designation is characterized by a mix of forestry, agriculture, residential, and recreational uses (Cook County 2011). Adjacent privately owned parcels to the north and

southeast are also within this county zoning designation. The tract is bordered on the west and south by Superior National Forest lands within the General Forest – Longer Rotation Management Area (see Figure 4.3.1-3).

### **Existing Land Use**

Tract 5 was formerly owned and used by Wheaton College. A bunkhouse, fire ring, outhouse, and cistern are present, although these structures are not in active use and would be removed prior to the completion of the Land Exchange Proposed Action. The tract's eastern boundary is formed by McFarland Lake, an entry point to the BWCAW. Access to the property is by water from a landing off CR 16, or by a walking trail from the end of CR 16 (Lisson and Gawtry 2011).

### **Property Rights, Title, and Mineral Resources**

PolyMet owns the surface rights for this tract. The tract is subject to a mortgage in favor of Iron Range Resources, which would be satisfied at closing of the Land Exchange Proposed Action (USFS 2011c).

The tract was assessed for mineral potential and encumbrances as part of the Feasibility Analysis completed in 2009. The geology underlying the tract is composed of gabbro and sedimentary rocks. Studies of the mineral potential in this area are rare because of the proximity to the BWCAW, but this type of formation has not shown mineral potential elsewhere in the county. The MDNR core library index shows no drilling in or near the area. There are no nearby gravel operations that would indicate any potential for surficial materials (USFS 2009c).

There appears to be low potential for exploration or development of bedrock or surficial deposits within Tract 5 (Barr 2011c). Mineral rights to Tract 5 are outstanding, but deeds do not appear to waive the right to subjacent support (USFS 2011c) (i.e., mineral exploration and extraction may not compromise the “lay of the land” by weakening underground support of the surface).

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### **4.3.2 Water Resources**

The federal lands are similar to the Mine Site area previously discussed, but excludes the privately-owned land bordering Dunka Road to the south of the Mine Site. Section 4.2.2 presents a discussion of the existing conditions on the federal lands. The water resources of the federal lands are briefly described in Section 4.3.2.1. Water resources of the non-federal lands are described in Section 4.3.2.2.

#### **4.3.2.1 Federal Lands**

##### **4.3.2.1.1 Land Exchange Proposed Action**

The Land Exchange Proposed Action consists of exchanging 6,495.4 acres of federal lands (see Figure 3.3-1) for 7,075.0 acres of non-federal lands. Most of the Mine Site is composed of federal lands, with a small portion located south of Dunka Road being non-federal lands. The Land Exchange Proposed Action also includes federal lands located north and west of the Mine Site.

##### **Groundwater**

Groundwater resources in and near the Mine Site are discussed in detail in Section 4.2.2.2.1. In general, the glacial aquifer within the Land Exchange Proposed Action federal lands is typically very thin (less than 30 ft) with limited yield; there are no large-scale regional aquifers (MPCA 1995). The Duluth Complex, which immediately underlies the glacial material, is the least fractured of the bedrock units in the area, and therefore has the poorest aquifer characteristics.

##### **Surface Water**

Surface water resources in and near the Mine Site are discussed in detail in Section 4.2.2.2.2. Surface water resources within the Land Exchange Proposed Action federal lands include Mud Lake (PW-148P), and 3.8 miles of the Partridge River and 0.7 miles of Yelp Creek (see Table 4.3.2-1), also a MDNR-designated public water resource. There are no known wild rice beds within these public waters.

**Table 4.3.2-1 Summary of Surface Water and Wild Rice Beds for Federal Lands**

	<b>Federal Lands</b>	
	<b>Land Exchange Proposed Action</b>	<b>Land Exchange Alternative B</b>
Public Water Lakes, ac. (mi. shore)	30.5 (0.9)	Approximately 8.9 (0.2)
Public Water Streams, mi. stream	4.5	4.5
Wild Rice Beds, ac.	--	--

Sources: PW data from MDNR 2012j; Wild Rice data from MDNR 2008c.

#### **4.3.2.1.2 Land Exchange Alternative B**

Land Exchange Alternative B: Smaller Federal Parcel lands are somewhat smaller than the Land Exchange Proposed Action, totaling 4,752.6 acres, which excludes the far western portion of the Land Exchange Proposed Action federal land area (see Figure 3.3-1). The Land Exchange Alternative B consists of exchanging 4,752.6 acres of federal lands for 4,926.3 acres of non-federal lands.

##### **Groundwater**

Groundwater resources of the Land Exchange Alternative B: Smaller Federal Parcel lands are essentially the same as those of the Land Exchange Proposed Action.

##### **Surface Water**

Surface water resources of the Land Exchange Alternative B: Smaller Federal Parcel lands are essentially the same as those of the Land Exchange Proposed Action, with the exception that the northwest boundary of the Land Exchange Alternative B bisects Mud Lake, including only about 30 percent of its shoreline.

#### **4.3.2.2 Non-federal Lands**

Water resources considered in this evaluation of the five non-federal land tracts proposed for exchange include the following:

- Quality and flow of groundwater;
- Quality and flow of surface water; and
- Quantity of wild rice beds.

#### **4.3.2.2.1 Regional Groundwater Resources**

##### **Regional Groundwater Water Quality**

There are no known, site-specific groundwater quality data for any of the non-federal Land Exchange Proposed Action lands. However, there were two studies that collected surficial groundwater quality data throughout the region that may be used to generally characterize potential groundwater quality at the exchange sites. The MPCA studied groundwater quality throughout the state, and published several documents that describe the general condition of the groundwater resource in northeast Minnesota. They note that glacial aquifers in this part of the state are commonly thin and limited in their extent and yield; there are no large-scale regional aquifers (MPCA 1995). The Regional Copper-Nickel Study (Siegel and Ericson 1980) generally focused on the area around the Duluth Complex, so data from that study may not be as broadly applicable.

In addition, between 1992 and 1996, the MPCA's Ground Water Monitoring and Assessment Program sampled 21 wells completed in surficial sand and gravel aquifers and 64 completed in buried, confined sand and gravel aquifers within MPCA Region 1, which encompasses seven counties in northeastern Minnesota including St. Louis County (MPCA 1999a). The MPCA study concluded that groundwater quality across the region is generally good. Concentrations of major cations and anions were lower in surficial and buried drift aquifers compared to similar

aquifers statewide, while concentrations of trace metals were higher. They noted that since geology controls groundwater quality in the region, trace inorganic constituents commonly found in the bedrock, such as beryllium, manganese, boron, arsenic, and selenium may have naturally elevated concentrations locally. Of the 85 surficial and buried aquifer samples that were collected, MPCA recorded five exceedances of the state drinking water criteria for beryllium, four for manganese, and one for boron. There were no exceedances noted for arsenic or selenium.

Although these data may not be directly applicable to any one of the Land Exchange Proposed Action lands, they can be used to draw general conclusions about the probable range of water quality. Table 4.2.2-6 summarizes Mine Site groundwater quality data and compares it with the MPCA (i.e., Northeast MN Baseline) and copper-nickel (i.e., Cu-Ni Baseline) study data for surficial aquifers. The range of values across the region for the five constituents of concern noted by the MPCA was generally comparable to the ranges monitored at the Mine Site, with the exception of manganese, which was higher for some of the regional samples.

### ***Probable Groundwater Source Areas for the Exchange Lands***

As suggested by the MPCA study for the northeast region, all of the exchange tracts, with the possible exception of the Tract 1, appear to be characterized by thin glacial aquifers with limited yield. Source areas of surficial groundwater also appear to be limited, usually within a mile or two of each tract.

The general applicability of the regional, surficial data to the exchange lands is somewhat dependent on the potential for local anthropogenic (man-made) contamination of groundwater. A cursory evaluation of the surficial groundwater source area for each parcel is made in the groundwater discussion for each of the tracts below.

#### **4.3.2.2.2 Surface Water Resources**

The five tracts drain either south to the Lake Superior Watershed or north to the Hudson Bay Watershed. Except for timber harvest, they are all generally undisturbed with native forest cover. Little, if any, hydrologic or water quality data has been collected for any of the tracts. The surface water resources of each tract are described below. Table 4.3.2-2 summarizes the surface water and wild rice beds of each tract.

***Table 4.3.2-2 Summary of Surface Water and Wild Rice Beds for all Land Exchange Proposed Action Tracts***

	Non-federal Lands					
	Tract 1 – Hay Lake Lands	Tract 2 – Lake County Lands	Tract 3- Wolf Lands	Tract 4 – Hunting Club Lands	Tract 5 – McFarland Lake Lands	Non- federal Totals
Public Water Lakes, ac. (mi. shore)	125.7 (2.8)	--	--	--	0 (0.2)	<b>125.7 (3.0)</b>
Public Water Streams, mi. stream	8.1	--	1.0	--	--	<b>9.1</b>
Wild Rice Beds, acres.	125.7	--	--	--	--	<b>125.7</b>

Sources: PW data from MDNR 2012j; Wild Rice data from MDNR 2008c.

#### 4.3.2.2.3 Tract 1 – Hay Lake Lands

##### **Groundwater**

This tract would appear to be the most susceptible of all the tracts to anthropogenic influences since it is located only a few miles away from the Mesabi Iron Range and several local communities. However, a natural topographic and bedrock divide separates most of the Mesabi Iron Range mining activities from the tract, meaning that surficial groundwater flow to the tract is isolated from most mining and community influences. One mining feature within the same watershed (Pike River) is ArcelorMittal Steel’s Tailings Basin, located about 0.5 miles to the west. The general topography of the area suggests that groundwater flow from the Tailings Basin is to the northeast, away from the Hay Lake lands. Limited surface water quality data from Hay Lake and Rice Lake indicate that sulfate concentrations vary between less than 1.0 and 3.6 mg/L (Barr 2012a), indicating no influence from the Tailings Basin.

Three piles of household waste and soil with minor oil impacts were removed from the Hay Lake tract by PolyMet. Confirmation soil sampling and analyses indicated all impacted soils were removed, and found no evidence that contamination had migrated to groundwater (NTS 2011).

##### **Surface Water**

Hay Lake lands drain to the Pike River, which flows into Lake Vermilion near Tower, Minnesota (see Figure 4.3.2-1). The lands contain two MDNR-designated public water lakes—Hay Lake (PW 69-579P) and Rice Lake (PW 69-578W). Hay Lake is 96.2 acres with 1.9 miles of shoreline; Rice Lake is 29.5 acres with about 1 mile of shoreline. This tract also contains about 8 miles of the Pike River, an MDNR-designated public water stream. Hay Lake, Rice Lake, and the Pike River, all of which contain wild rice beds, lie within the Hay Lake lands. These are the only waterbodies within the proposed non-federal land exchange tracts known to contain wild rice beds. These waterbodies were included in four annual wild rice surveys performed from 2009 to 2012 (Barr 2009b; 2011a; 2012a; 2013m); survey results were similar for 2009-2011 with no apparent trends in density or distribution. Hay Lake was found to have small, low density wild rice beds (density factor 1 of 5) across the entire lake. Rice Lake was found to have many beds across the entire lake with density factor ratings of 3 to 5. Pike River was also found to have beds with density factor ratings of 3 to 5 across the entire river near Rice Lake, with near-bank beds further upstream. The survey performed in 2012 found lower densities of wild rice beds. Hay Lake, Rice Lake, and the Pike River all had density factor ratings of 1. The decreases in density in Rice Lake and the Pike River were consistent with a decrease in wild rice bed density across all areas surveyed in 2012.

ArcelorMittal Steel’s Tailings Basin is located about 2 miles northwest of Hay Lake (see Figure 4.3.2-1). Seepage from the basin flows north into Wouri Creek, which is also a tributary to the Sandy River. Three water quality samples taken from Hay Lake during the summer of 2009 all had a sulfate concentration of 1.1 mg/L, and one sample taken in 2010 had a sulfate concentration less than 1 mg/L (Barr 2011a), suggesting that seepage from the ArcelorMittal Steel’s Tailings Basin is not reaching the lake. Water clarity was estimated at 6 to 12 ft based on 1999-2001 satellite imagery. Sulfate concentrations in Rice Lake and in the Pike River just downstream of Rice Lake were measured annually from 2009 to 2012 during the wild rice surveys. Sulfate concentrations in Rice Lake ranged from 2.1 to 2.4 mg/L. Sulfate concentrations

in the Pike River just downstream of Rice Lake ranged from 2.1 to 3.6 mg/L (Barr 2013l). There are no other known water quality data for this tract.

#### **4.3.2.2.4 Tract 2 – Lake County Lands**

##### **Groundwater**

The Lake County lands are located near the headwaters of small, tributary streams with local source areas for groundwater. There are no known land-use activities within the source areas that suggest the potential for detrimental effects to groundwater quality.

##### **Surface Water**

This tract contains four parcels; three are located in close proximity to each other with a fourth parcel located about 14 miles to the southeast (see Figure 4.3.2-2 and Figure 4.3.2-3). There are no DNR-designated public waters within Tract 2. The three clustered parcels flow to the southwest through a series of small streams that are tributaries to the Cloquet River. The Cloquet River drains into the St. Louis River, which ultimately drains into Lake Superior. The Lake County South parcel flows to a tributary of the Beaver River (MDNR-designated public water stream), which ultimately drains into Lake Superior. There are no known water quality data for this tract.

#### **4.3.2.2.5 Tract 3 – Wolf Lands**

##### **Groundwater**

The Wolf Lands are located near the headwaters of small, tributary streams with local source areas for groundwater. There are no known land-use activities within the source areas that suggest the potential for detrimental effects to groundwater quality.

##### **Surface Water**

This tract consists of four parcels (see Figure 4.3.2-3, Figure 4.3.2-4, Figure 4.3.2-5, and Figure 4.3.2-6). Wolf Lands 1 is located immediately adjacent to the Lake County lands, contains no protected waters, and discharges to the same Cloquet River tributary as the Lake County lands.

Wolf Lands 2 is located adjacent to two creeks that are tributaries to Greenwood Lake; Mary Ann Creek is located to the west and an unnamed creek is located to the southeast. Greenwood Lake flows northerly to the Stony River. There are no public waters within this parcel.

Coyote Creek flows within the northern portion of Wolf Lands 3 and bifurcates Wolf Lands 4. Coyote Creek is a tributary and a MDNR-designated public water stream to McDougal Lake, which eventually flows into Stony River. Wolf Lands 3 contains 0.1 mile and Wolf Lands 4 contains 0.9 mile of Coyote Creek. There are no known water quality data for this tract.

#### **4.3.2.2.6 Tract 4 – Hunting Club Lands**

##### **Groundwater**

The Hunting Club lands are located near the headwaters of small, tributary streams with local source areas for groundwater. There are no known land-use activities within the source areas that suggest the potential for detrimental effects to groundwater quality.

##### **Surface Water**

This entire tract drains into an unnamed tributary of the Vermilion River, which flows north to Crane Lake (see Figure 4.3.2-7). There are no DNR-designated public waters within this land. There are no known water quality data for this tract.

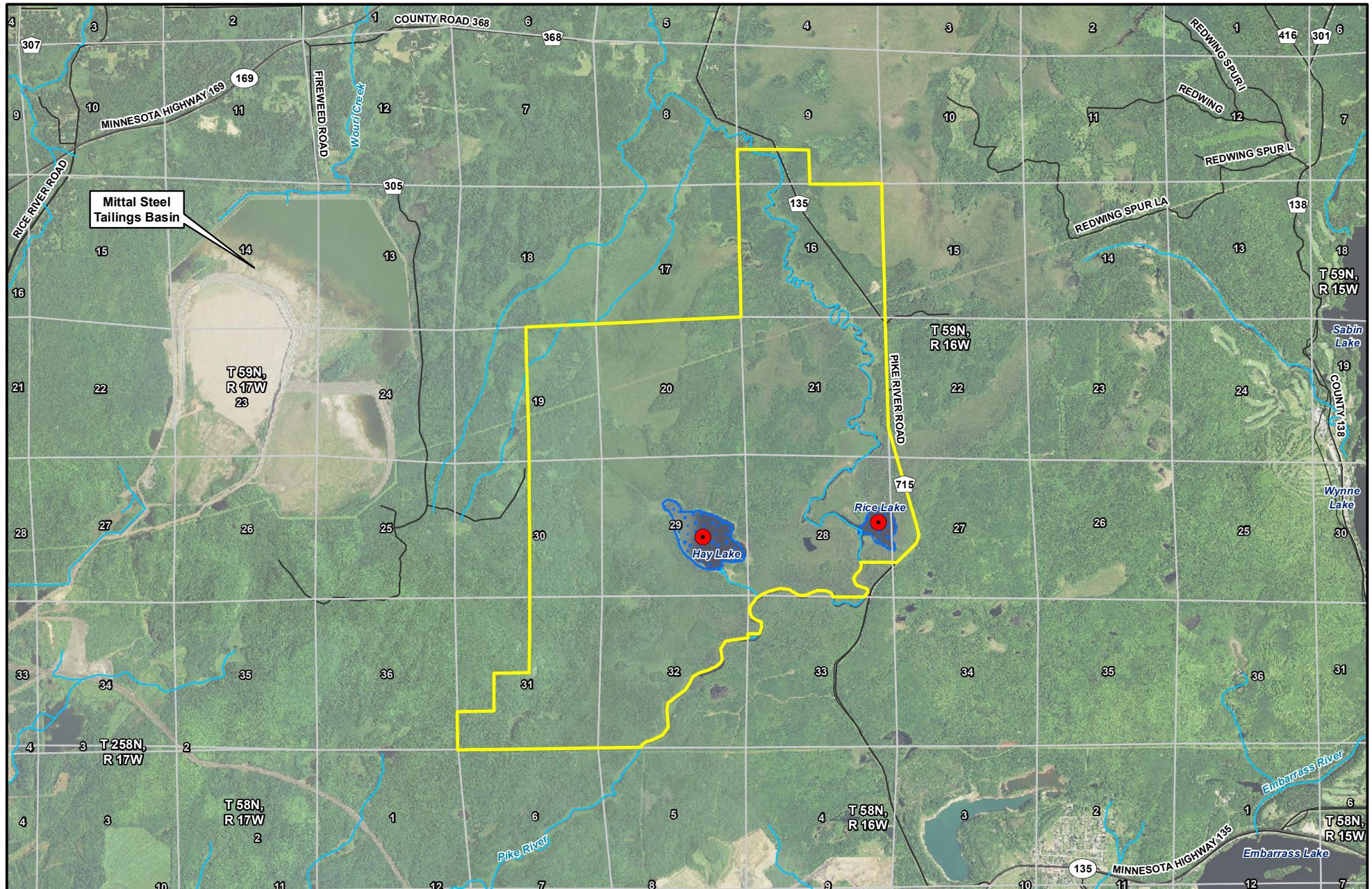
#### **4.3.2.2.7 Tract 5 – McFarland Lake Lands**

##### **Groundwater**

The McFarland Lake lands may have the most limited groundwater resource of all the tracts due to very shallow glacial material over bedrock. Source areas for groundwater flow to the tract appear to be limited to the tract itself and a small, undeveloped drainage 0.5 mile northwest of the tract. There are no known land-use activities within the source area that could potentially affect groundwater quality.

##### **Surface Water**

This tract is tributary to McFarland Lake (MDNR PW 027P), which drains into the border lakes of the BWCAW (see Figure 4.3.2-8). It contains about 0.2 mile of McFarland Lake shoreline. There is no known water quality data for this tract or for McFarland Lake, other than 13 secchi disk (water clarity) readings taken from 1989 through 2008. The average secchi disk reading was 16.1 ft, which is near the high end of the typical range for water clarity in this region of Minnesota. This secchi disk reading indicates that McFarland Lake is about mid-way between oligotrophic and mesotrophic, which suggests that the lake has relatively low nutrient enrichment.



0 0.325 0.65 1.3 Miles

**Figure 4.3.2-1**

## **Surface Water**

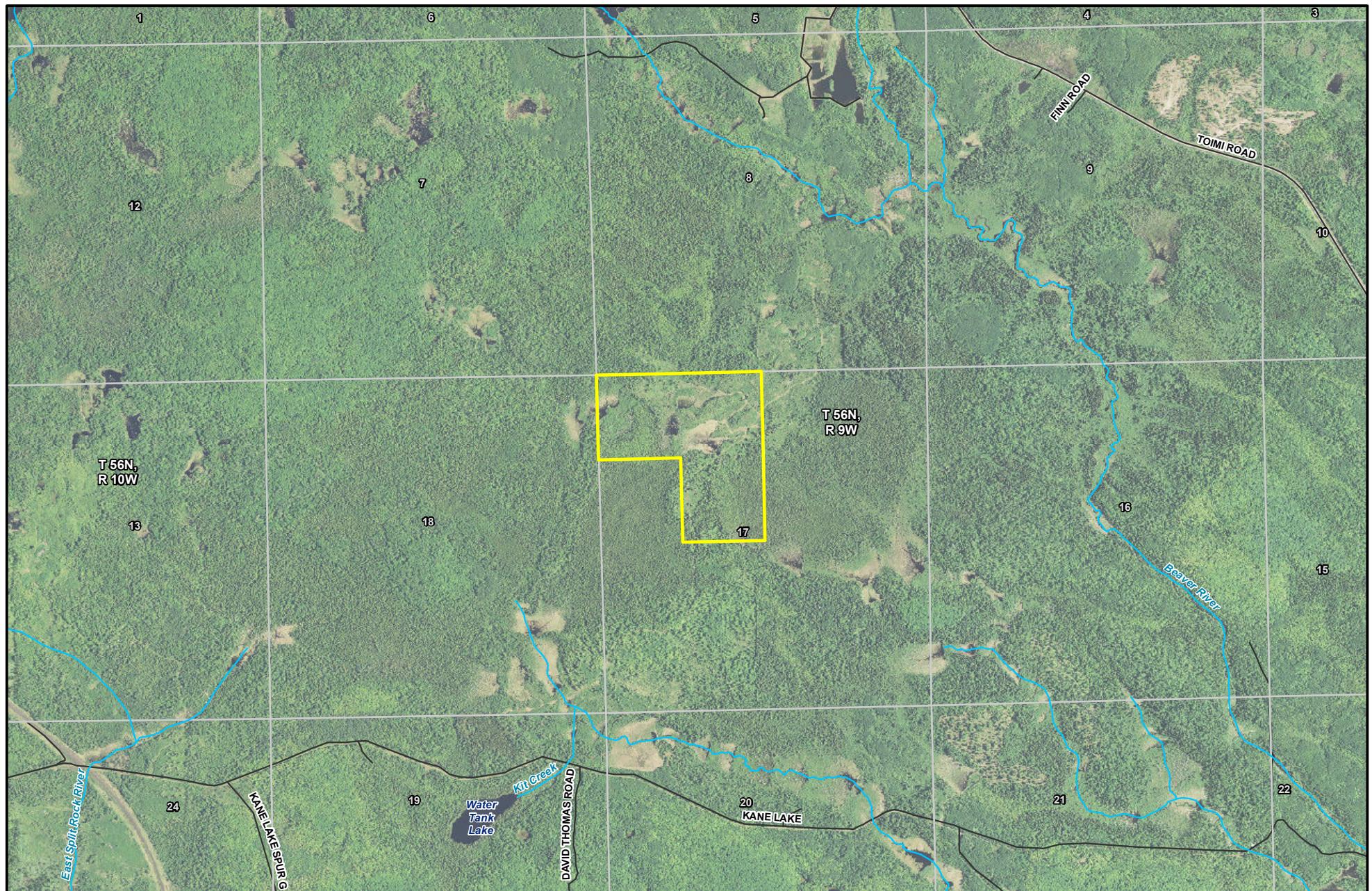
# **Tract 1 - Hay Lake Lands**

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■ Non-federal Lands   ■ Section Boundary  
● Wild Rice Location   1 Section Label  
■ Wild Rice Lake   — Road  
~~~~~ Stream/River

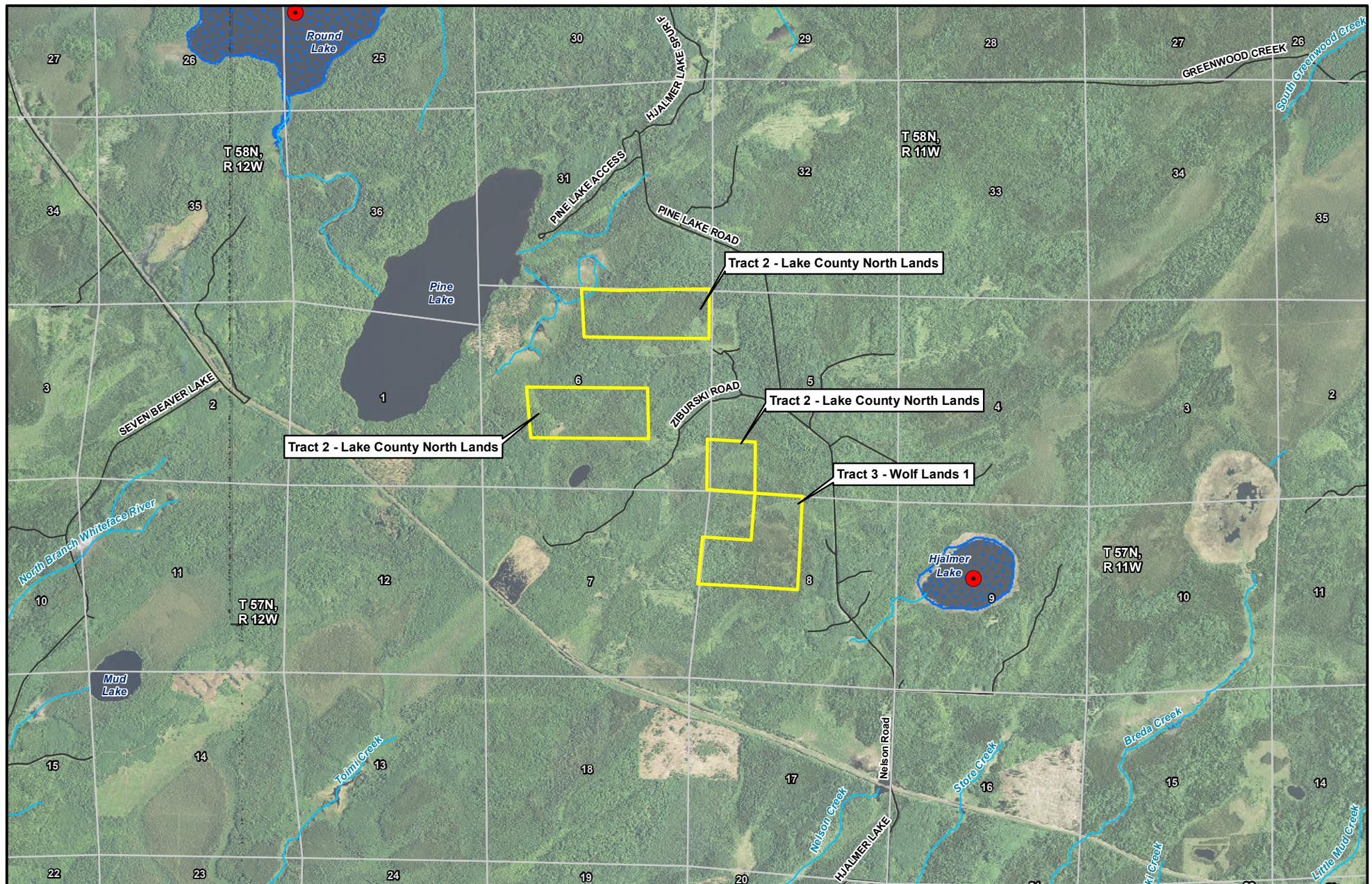


0   0.125   0.25   0.5 Miles

**Figure 4.3.2-2**  
**Surface Water**  
**Tract 2 - Lake County South Lands**  
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■ Non-federal Lands   ■ Section Boundary  
● Wild Rice Location   1 Section Label  
■ Wild Rice Lake   — Road  
~~~~~ Stream/River

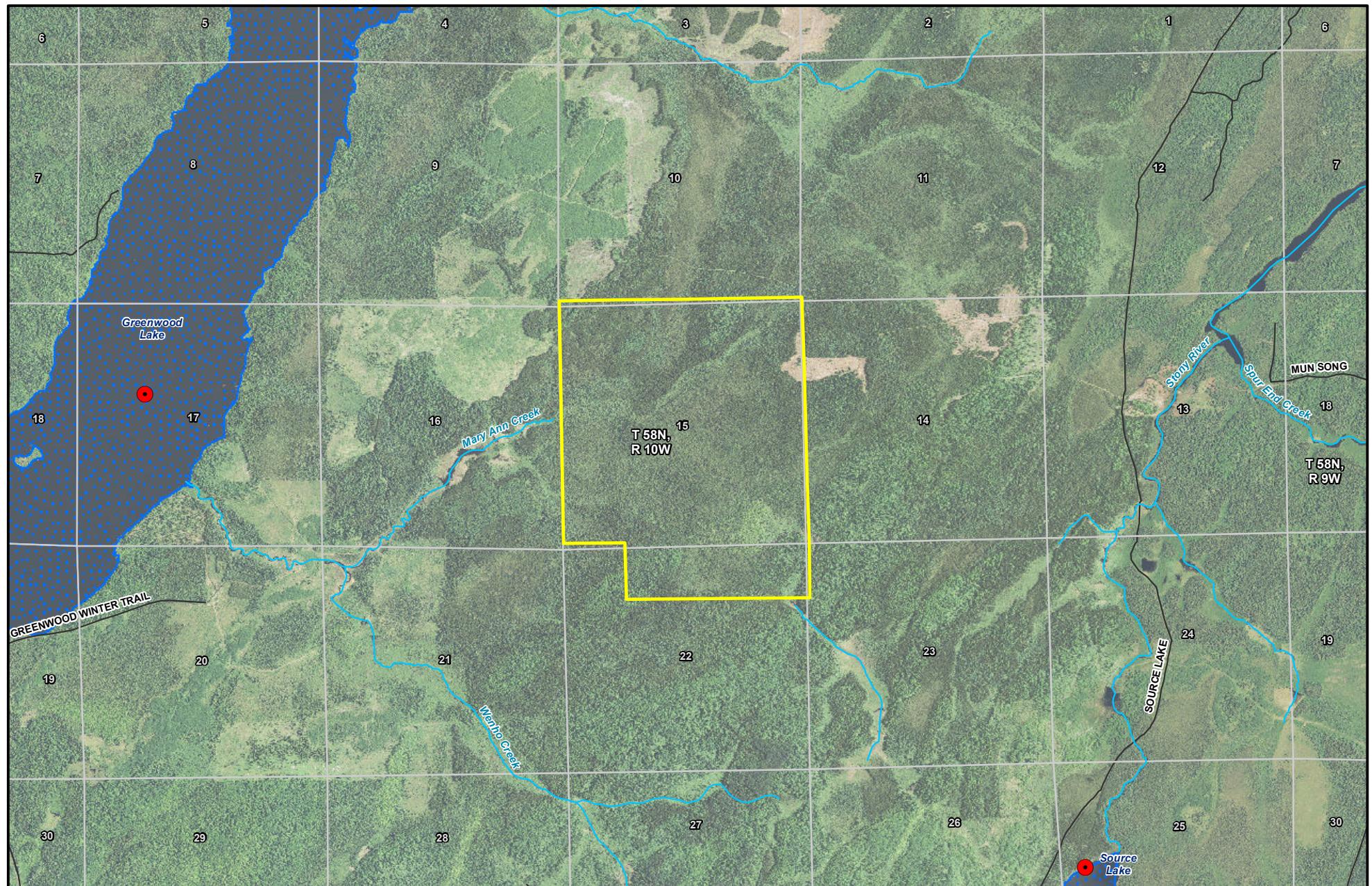


0   0.25   0.5   1  
 Miles

**Figure 4.3.2-3**  
**Surface Water**  
**Tract 2 - Lake County North Lands and Tract 3 - Wolf Lands 1**  
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■ Non-federal Lands   ■ Section Boundary  
● Wild Rice Location   1 Section Label  
■ Wild Rice Lake   — Road  
~~~~~ Stream/River

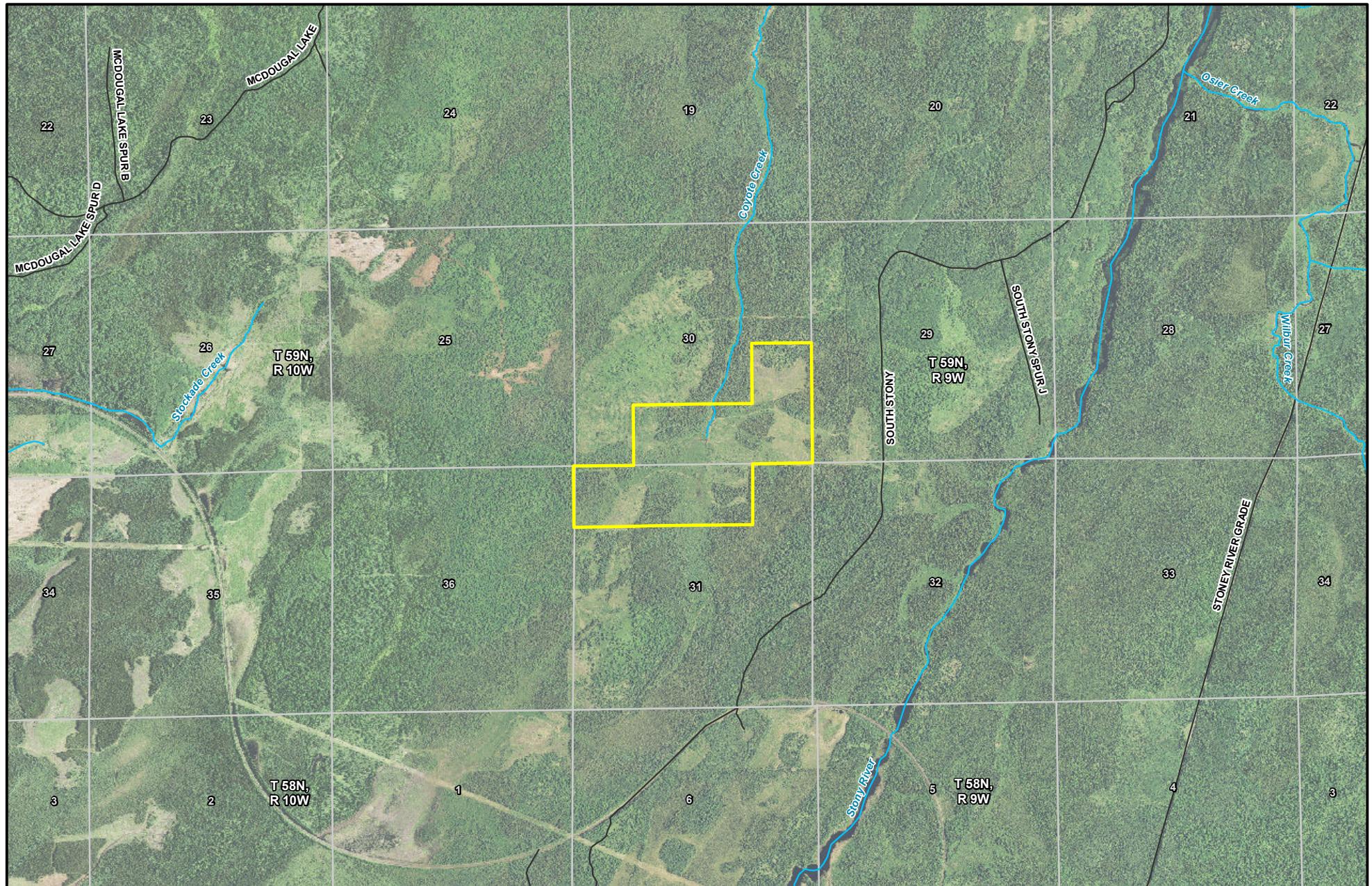


0   0.175   0.35   0.7  
 Miles

**Figure 4.3.2-4**  
**Surface Water**  
**Tract 3 - Wolf Lands 2**  
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  Non-federal Lands     Section Boundary  
● Wild Rice Location   ■ Section Label  
  Wild Rice Lake   — Road  
~ Stream/River

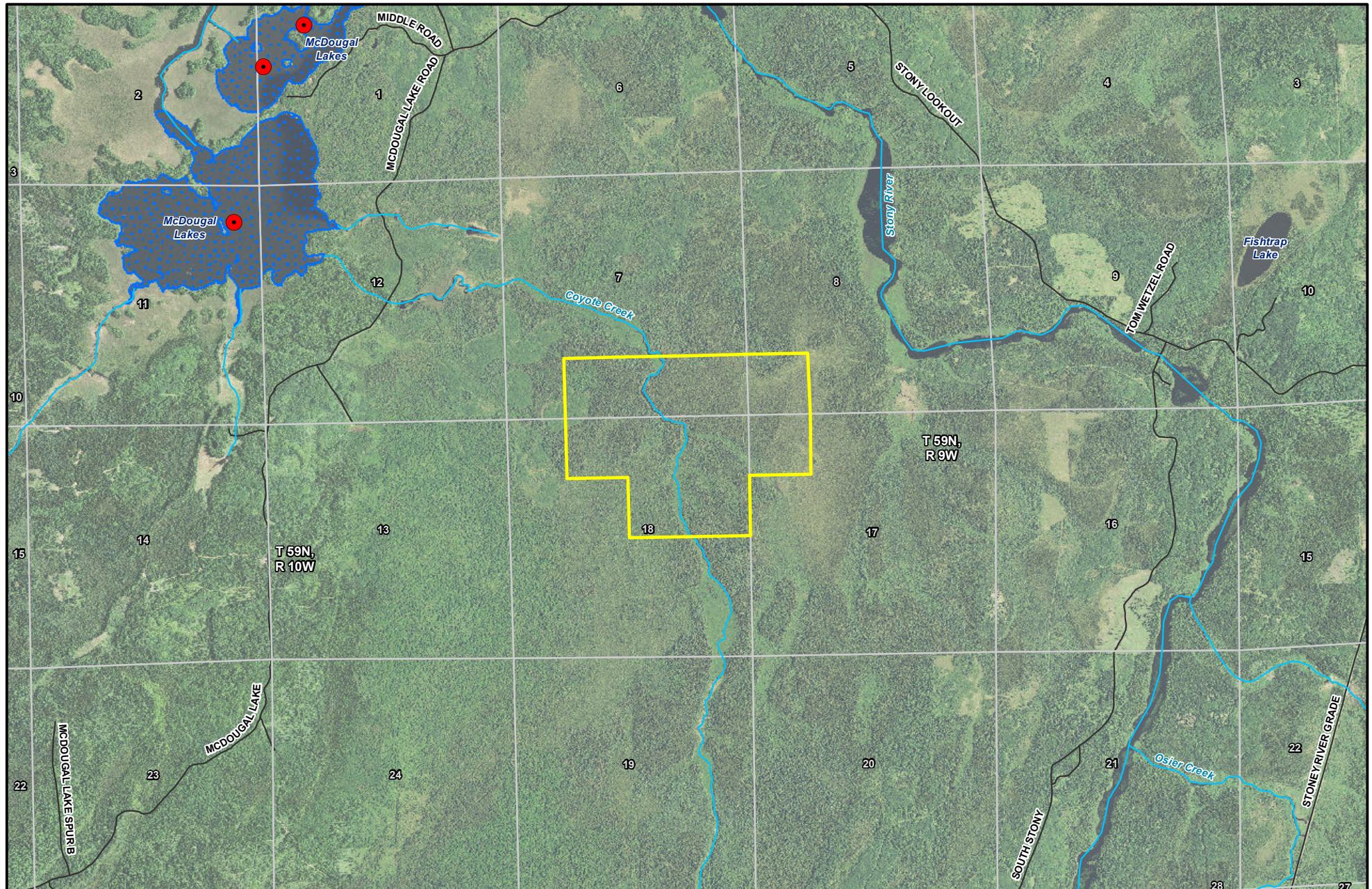


0   0.175   0.35   0.7  
 Miles

**Figure 4.3.2-5**  
**Surface Water**  
**Tract 3 - Wolf Lands 3**  
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  Non-federal Lands     Section Boundary  
● Wild Rice Location   ■ Section Label  
  Wild Rice Lake     Road  
~ Stream/River



0 0.175 0.35 0.7 Miles  
 N E  
 S W

**Figure 4.3.2-6**  
 Surface Water  
 Tract 3 - Wolf Lands 4  
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  Non-federal Lands     Section Boundary  
● Wild Rice Location   1 Section Label  
  Wild Rice Lake     Road  
~ Stream/River



0 0.25 0.5 1 Miles  
 N E  
 S W

**Figure 4.3.2-7**  
**Surface Water**  
**Tract 4 - Hunting Club Lands**  
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  Non-federal Lands     Section Boundary  
● Wild Rice Location   ❶ Section Label  
  Wild Rice Lake     Road  
~ Stream/River



0 0.15 0.3 0.6 Miles  
 N E  
 S W

**Figure 4.3.2-8**  
**Surface Water**  
**Tract 5 - McFarland Lake Lands**  
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### **4.3.3    Wetlands**

#### **4.3.3.1    Federal Lands**

The federal lands, both the Land Exchange Proposed Action and Land Exchange Alternative B boundaries, are located in the Partridge River Watershed, about 3 miles south of the Laurentian Divide (see Figures 4.3.3-1 and 4.2.2-1). As previously stated, the Partridge River is located in the East St. Louis River Watershed, which discharges into Lake Superior. Much of the federal lands consist of wetlands and the Land Exchange Proposed Action boundary includes a portion of the One Hundred Mile Swamp. The One Hundred Mile Swamp (see Figure 4.3.3-1) is a large wetland of approximately 3,028 acres that was aerially surveyed by the MDNR as part of a larger study (MDNR 1997); however, no delineated boundary exists for the One Hundred Mile Swamp. The following sections provide baseline information on the Land Exchange Proposed Action and Land Exchange Alternative B boundaries.

##### **4.3.3.1.1    Land Exchange Proposed Action**

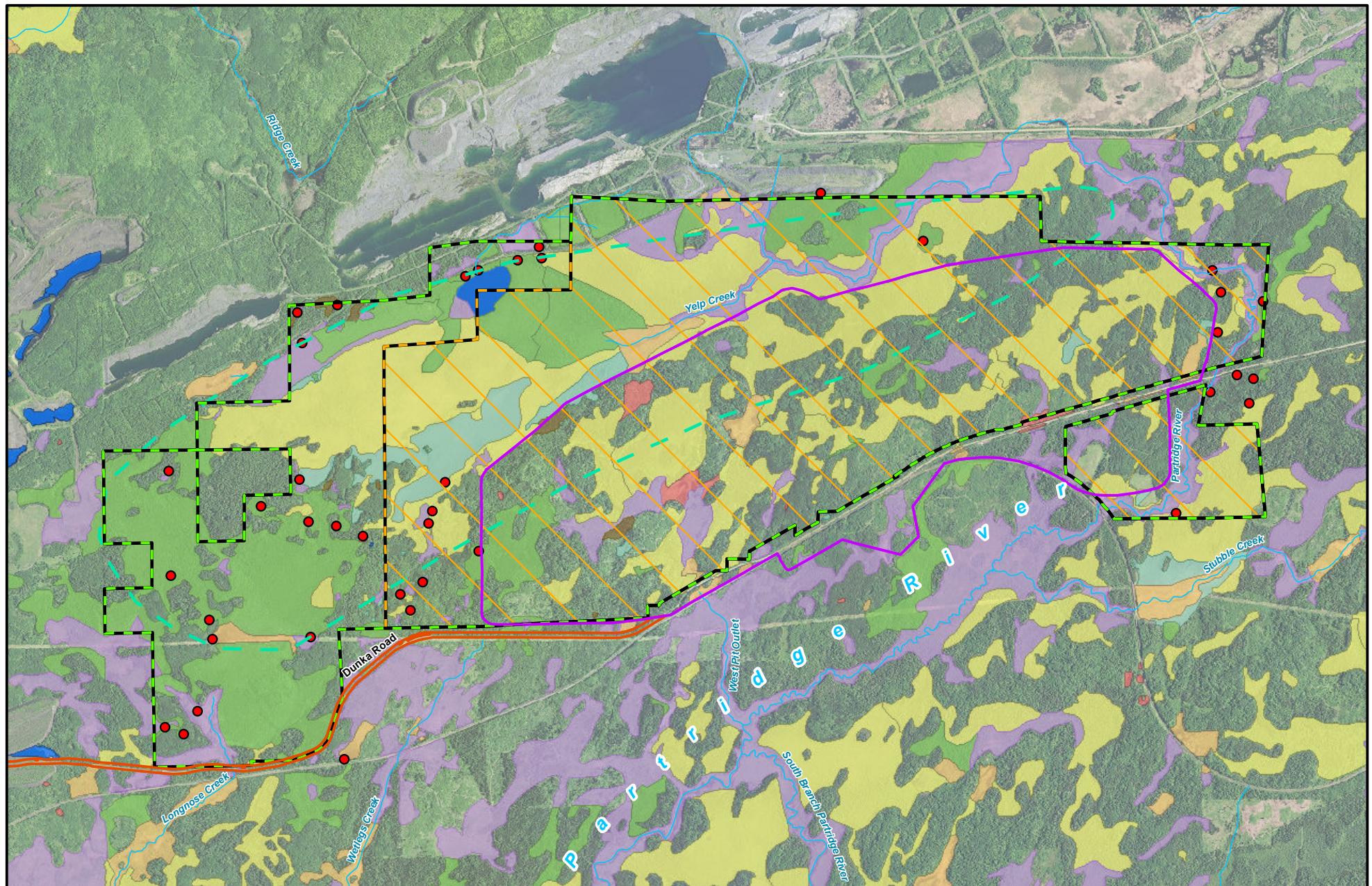
###### **Wetland Delineation and Classification**

Wetland characterization, mapping, and surveys for the federal lands were conducted between 2004 and 2010. The wetland delineation and classification is the same as described in Section 4.2.3.1.1. The federal lands within the Land Exchange Proposed Action encompass 6,495.4 acres (see Figure 4.3.3-1).

Wetland delineations of the federal lands surrounding the Mine Site were subsequently conducted in August 2004, June 2005, and July 2006. Between 2007 and 2010, additional wetlands within the federal lands adjacent to the Mine Site were identified from aerial photographic interpretation and field studies. In August 2008, additional upland and wetland habitat surveys were conducted on the areas outside the Mine Site on the adjoining federal lands. Initially, potential wetland locations were determined by reviewing CIR aerial photographs, USGS topographic maps, and wetland maps previously prepared. Aerial photographs and field maps were then used in the field to verify cover types. Upon completion of field studies, cover types were mapped as habitat polygons. Polygons were digitized using GIS and overlaid onto habitat maps created from aerial photographs. These maps and the associated GIS database were used to determine the approximate acreage of each wetland type.

During the field surveys, data was collected related to the overall functions and values of the wetlands within the federal lands associated with the Mine Site (see Section 4.2.3.1.3) and of representative wetlands within the federal lands adjacent to the Mine Site. Wetland functions and values were rated using the guidelines in the MnRAM, Versions 3.0-3.2.

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0 0.25 0.5 1 Miles  
N E  
W S

**Figure 4.3.3-1**  
**Wetland Community Types Federal Lands**  
**and Alternative B: Smaller Federal Parcel**  
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### **Hydrology, Wetland Vegetation, and Community Types**

The hydrology, wetland vegetation, and community types of the federal lands within the Land Exchange Proposed Action include those elements within the Mine Site boundary (see Section 4.2.3.1.2), as well as the adjoining federal lands to the northwest. The hydrology, wetland vegetation, and community types are discussed below.

Bogs in the federal lands consist of leatherleaf and bog Labrador-tea, with scattered speckled alder, swamp birch, tamarack, and, in some areas, cattail and sedges. Sphagnum moss was observed to cover 80 to 90 percent of the bogs. Other species encountered during the field work include: black spruce, tamarack, blueberry, small fruited bog cranberry, willows, purple pitcher plant, marsh cinquefoil, cottongrass, round sundew, starflower, bunchberry, and Solomon's seal (AECOM 2011a).

Shrub swamp communities on the adjoining federal lands surrounding the Mine Site were observed to consist of a dense cover of speckled alder. These wetlands typically include sapling balsam fir, jack pine, black spruce, willow, and the occasional American mountain-ash. Dominant low shrubs include bog Labrador-tea, leatherleaf, lowbush blueberry, prickly rose, raspberry, and red-osier dogwood. Mountain maple saplings were also present during the field work in a few wetlands. Herbaceous layer species include club and sphagnum mosses, woolly sedge, bluejoint, horsetail, wood fern, bunchberry, bluebead lily, starflower, and creeping snowberry (AECOM 2011a).

The forested swamp communities (coniferous swamps and hardwood swamps) for the federal lands surrounding the Mine Site are also dominated by black spruce and northern white cedar, with scattered tamarack. Deciduous and mixed forest wetlands are uncommon; aspen is the dominant deciduous species found in these forests. Much of One Hundred Mile Swamp consists of mature (80-plus years) black spruce and northern white cedar. Bog Labrador-tea, leatherleaf, and blueberry are prevalent, as is spruce regeneration. In some areas with dense stands of spruce, few shrubs were seen during field surveys, but sphagnum and club mosses often covered nearly 100 percent of the ground. More open stands may have an understory comprised of shrubs and scattered sapling white cedar, tamarack, and black spruce, along with speckled alder and willow. Common species include bluebead lily, Solomon's seal, horsetail, starflower, and creeping snowberry. Some areas also have cottongrass and bog laurel. An area in the southern portion of One Hundred Mile Swamp has a large number of purple pitcher plants. Forest and shrub cover typically range from 40 to 70 percent, while moss and other understory vegetation cover from 60 to 90 percent of the ground (AECOM 2011a).

There were several ponds/inland fresh meadow (emergent) wetlands identified on the federal lands surrounding the Mine Site that were created by logging activities, road construction, or beaver dams, or were natural depressions or associated with the Partridge River. These wetlands were often dominated by bluejoint, sedges, and cattails. Water depths were several feet in deeper areas. Spruce and other trees associated with the wetland were often killed when flooded as a result of the rising water level. Willows, tamarack, and speckled alder were often found along the border of these wetlands, but comprised less than 20 percent of the cover. Wild iris is common in some inland fresh meadow wetlands, as was horsetail, burreed, spikerush, and woolly sedge (AECOM 2011a).

The wetland assessment identified 200 wetlands covering 4,164.4 acres (64 percent) within the 6,495.4 acre federal lands boundary (see Figure 4.3.3-1). Table 4.3.3-1 below summarizes the wetland areas within the federal lands represented by each Eggers and Reed (1997; 2014) wetland community type. A large portion of the wetlands within the federal lands are located in the floodplains of Yelp Creek and the Partridge River or one of their associated tributaries. The most common wetland types within the federal lands are coniferous bogs (approximately 47 percent), coniferous swamps (31 percent), and shrub swamps (approximately 13 percent), which includes alder thickets and shrub-carrs.

Other wetland community types present within the federal lands include open bog, shallow marsh, hardwood swamp, open water, and sedge/wet meadows. Section 4.2.3.1.2 provides a discussion on the hydrology, wetland vegetation, and community types of the federal lands.

**Table 4.3.3-1    Wetland Acreage by Wetland Community Type for the Federal Lands within the Land Exchange Proposed Action and within the Land Exchange Alternative B**

| Eggers and Reed Class <sup>1</sup>                   | Land Exchange<br>Proposed Action |     | Land Exchange<br>Alternative B |     |
|------------------------------------------------------|----------------------------------|-----|--------------------------------|-----|
|                                                      | Acres                            | %   | Acres                          | %   |
| Coniferous bog                                       | 1,961.4                          | 47  | 1,677.0                        | 59  |
| Coniferous swamp                                     | 1,287.8                          | 31  | 476.1                          | 17  |
| Deep marsh                                           | 0.0                              | 0   | 0.0                            | 0   |
| Hardwood swamp                                       | 21.1                             | <1  | 13.7                           | <1  |
| Open bog                                             | 209.5                            | 5   | 175.0                          | 6   |
| Open water (includes shallow, open water, and lakes) | 30.8                             | 1   | 8.6                            | <1  |
| Sedge/wet meadow                                     | 35.7                             | 1   | 34.9                           | 1   |
| Shallow marsh                                        | 97.0                             | 2   | 80.9                           | 3   |
| Shrub swamp (includes alder thicket and shrub-carr)  | 521.1                            | 13  | 394.7                          | 14  |
| Total                                                | 4,164.4                          | 100 | 2,860.9                        | 100 |

Note:

<sup>1</sup> Eggers and Reed 1997; 2014.

### **Wetland Functional Assessment**

The Land Exchange Proposed Action federal lands include the Mine Site area as well as the adjoining federal lands to the northwest. The wetland function and values assessment for the Mine Site is described in 4.2.3.1.3 and wetlands function and values for the federal lands surrounding the Mine Site are provided below.

During the surveys conducted for the federal lands surrounding the Mine Site, the primary wetland functions rated by MnRAM 3.2 were evaluated based on a review of the following: 1) wetland soil, hydrology, and vegetation; 2) outlet characteristics; 3) watershed and adjacent upland land uses and conditions; 4) erosion and sedimentation; and 5) human disturbances (AECOM 2011a). The Eggers and Reed (1997; 2014) classification system was used to classify wetland communities for the wetland function and value evaluation. Landscape factors were typically evaluated on a larger scale. Sixty-three questions given in MnRAM 3.2 were addressed for the August 2008 field surveys, and all factors were evaluated for each wetland surveyed. Based on this assessment methodology, wetlands were rated high, medium, or low.

The wetland functions that were typically most applicable to the federal lands include the following:

- Maintenance of characteristic hydrologic regime;
- Maintenance of wetland water quality;
- Vegetative diversity/integrity;
- Maintenance of characteristic wildlife habitat structure;
- Downstream water quality;
- Groundwater interaction; and
- Aesthetics/recreation/education/cultural.

During 2008, 40 wetlands, or portions of wetlands, were evaluated for their functions and values at representative wetland locations within the federal lands outside the Mine Site boundary (see Figure 4.2.3-2 and Table 4.3.3-2); nearly all wetlands were rated with a high value (approximately 93 percent) for wetland functions based on minimal or no current disturbance. Only a small subset (approximately 7 percent) of the wetlands was disturbed wetlands (AECOM 2011d). Vegetation diversity/integrity was high for 93 percent of the wetlands because they have been minimally altered by recent anthropogenic factors and had a relatively constant supply of water. Wetland vegetation around the Mine Site needed no active management and provided quality habitat for fish and wildlife. The overall rating was based on the highest rated community for vegetation diversity and integrity, rather than the average or weighted value for community vegetation diversity and integrity. MnRAM 3.2 guidance states that this is the appropriate measure for assessing wetland quality for regulatory purposes (AECOM 2011a).

Wildlife habitat was rated high for most wetlands on the basis of natural wildlife corridors and upland communities relatively untouched by recent human disturbances or effects. Wildlife habitat was rated lower in areas where there were few plant communities (AECOM 2011d).

Fish habitat was rated as not applicable for most wetlands, primarily because they did not have enough standing water throughout the year to support fish. Other characteristics associated with the rating include isolated wetlands that are not permanently flooded, or forested wetlands where the water table was below the surface for all or part of the year (AECOM 2011d).

Amphibian habitat was rated high for most wetlands, primarily because they stayed inundated long enough in most years to allow amphibians to successfully reproduce. Amphibian habitat was rated not applicable for some wetlands if conditions needed to support amphibian reproduction did not occur at the site. Forested wetlands with little or no standing water during the mating season would likely not support amphibians (AECOM 2011d).

Aesthetic, recreational, educational, and cultural values were rated medium. All wetlands were aesthetically pleasing and could be used for recreation, education, and cultural purposes. However, road access to the federal lands surrounding the Mine Site is only available via a private mining road and is not easily accessible to the general public (AECOM 2011d). Access to the federal lands is discussed in Section 4.3.1.

**Table 4.3.3-2    Wetland Functions and Values Assessment for the Federal Lands Surrounding the Mine Site, 2008**

| Wetland Functions and Value Rating | Functional Value Ratings (%)       |           |                   |                          |                       |                  |              |                   |                                       |
|------------------------------------|------------------------------------|-----------|-------------------|--------------------------|-----------------------|------------------|--------------|-------------------|---------------------------------------|
|                                    | Vegetation Diversity/<br>Integrity | Hydrology | Flood Attenuation | Downstream Water Quality | Wetland Water Quality | Wildlife Habitat | Fish Habitat | Amphibian Habitat | Aesthetics/<br>Education/<br>Cultural |
| High                               | 93                                 | 98        | 2                 | 95                       | 93                    | 93               | 38           | 55                | 0                                     |
| Moderate                           | 7                                  | 2         | 98                | 5                        | 7                     | 7                | 2            | 7                 | 100                                   |
| Low                                | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 5                 | 0                                     |
| Not Available or Applicable        | 0                                  | 0         | 0                 | 0                        | 0                     | 60               | 60           | 33                | 0                                     |
| Total                              | 100                                | 100       | 100               | 100                      | 100                   | 160              | 100          | 100               | 100                                   |

Source: AECOM 2011a.

### **Floodplains**

Floodplains are lowland areas adjacent to lakes, wetlands, and rivers that are prone to being inundated by water during a flood. Floodplains carry and store water and help to attenuate water flows. Floodplains also provide important habitat for fish and wildlife; filter sediments, nutrients, and pollutants from the water; and are important for public uses, such as fishing and hunting.

There are several definitions people use to estimate the limits of a floodplain. These include an ecological definition, a zoning or regulatory definition, and a hydrologic definition based upon the frequency of flood inundation. Ecologically defined floodplains are considered and described as wetlands for the effects analysis. Federal EO 11988, Section 2(a)(1), states that the “[d]etermination [of a floodplain] shall be made according to a Department of Housing and Urban Development (HUD) floodplain map or a more detailed map of an area, if available. If such maps are not available, the agency shall make a determination of the location of the floodplain based on the best available information.”

A Flood Insurance Rate Map (FIRM) developed by the Federal Emergency Management Agency (FEMA) for most of St. Louis County estimates the floodplain areas of inundation. The areas identified on the FIRM are considered “mapped floodplains.” The mapped floodplains can be the result of a detailed hydrologic investigation associated with a 100-year (1 percent chance) return frequency flood elevation or an approximation based upon topography of floodplains. Wetlands were not generally mapped as floodplains by FEMA because they had relatively less development pressure with less need for regulation and establishment of insurance rates. Smaller streams with a contributing drainage area of less than 1 square mile were not prioritized by FEMA for mapping. In addition, some areas adjacent to lakes were not mapped because the land use was managed by shoreland ordinances.

The Land Exchange Proposed Action federal lands are within a portion of St. Louis County that is unmapped by FEMA. Therefore, there is no FEMA estimate of the areas of inundation and there are no FEMA-mapped floodplains on the federal lands. However, a hydrologic model (XP-SWMM) was developed as part of the hydrologic analysis needed for the design of the NorthMet Project Proposed Action. The area of inundation associated with the 500-year

(or 0.2 percent chance) floodplain of the Partridge River was estimated as part of this analysis. This estimate of the floodplain area in the federal lands was used for the effects analysis.

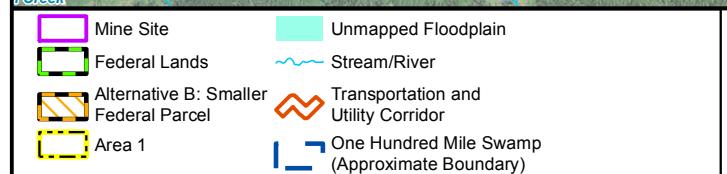
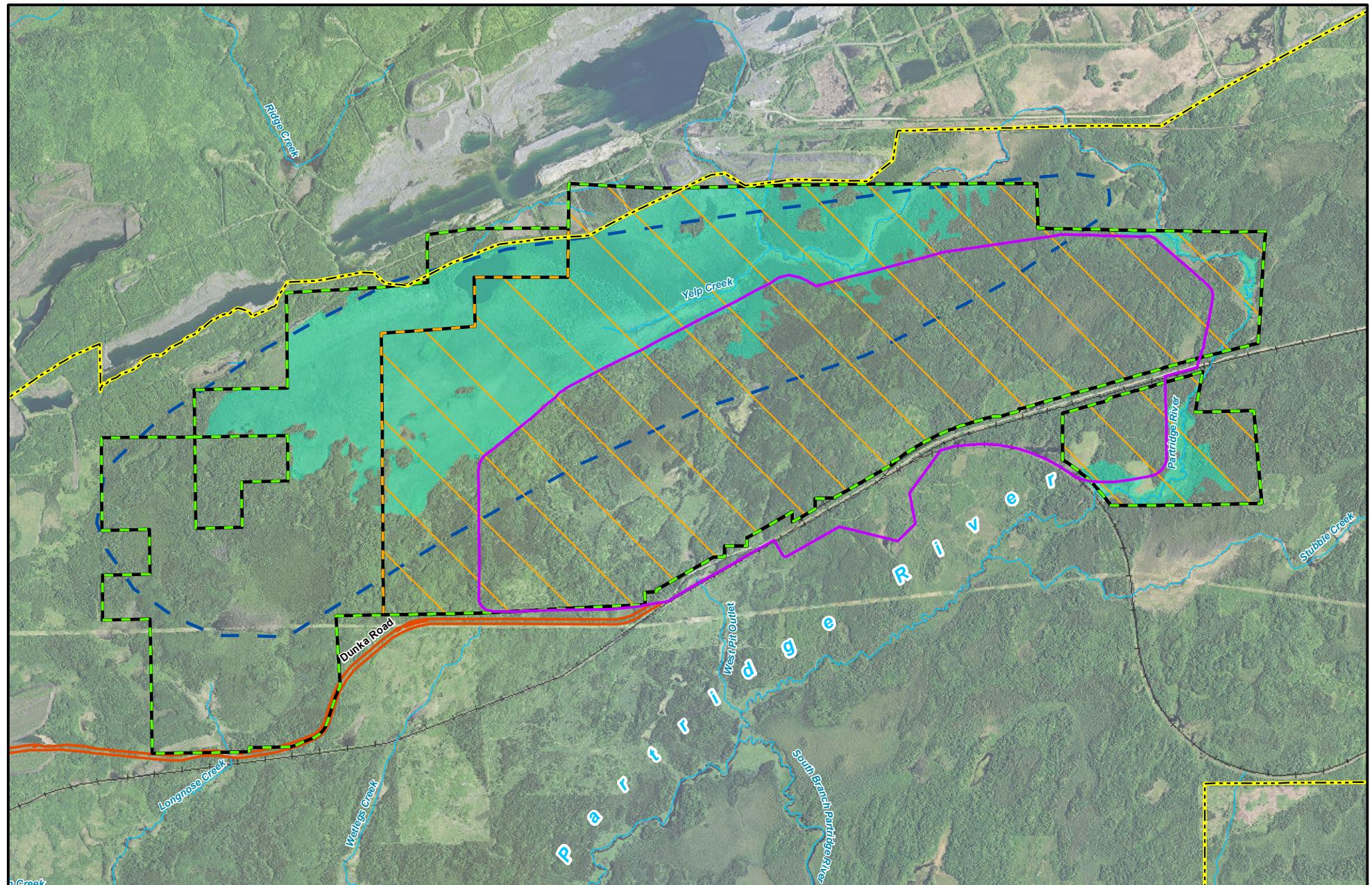
Floodplain importance was determined by measuring the number of acres of floodplain per acre of parcel as an index to the relative importance of floodplains on the parcels. The unmapped floodplain area on the federal lands associated with the Partridge River and Yelp Creek, estimated using the XP-SWMM, was estimated to total 1,889.4 acres of floodplain (500-year floodplain) (see Figure 4.3.3-2). The ratio of the number of acres of floodplain per acre of parcel for the federal lands is 0.3. The proposed mining activity associated with the NorthMet Project Proposed Action would be managed by the MDNR Permit to Mine to manage the flood damage potential for upstream and downstream property owners.

#### **Frontage of Waterways**

Lakes, streams, and rivers/creeks and their associated riparian habitat provide important habitat for fish and wildlife and provide for additional recreational and social functions and values for humans. Lake, stream, and river/creek frontage and associated habitat are not typically evaluated during a wetland assessment, and were not considered during the wetland assessment field studies conducted for the NorthMet Project Proposed Action. However, the linear distance of lake and river/stream frontage for the federal lands was determined using GIS, and the length of frontage per acre of parcel was calculated as an index of the relative importance of frontage on the parcels.

Mud Lake, the dominant lake feature on the federal lands, is located within the One Hundred Mile Swamp and is 30.5 acres in size. Mud Lake was determined to have a frontage of approximately 4,550 ft. The length of lake frontage per acre of federal lands is 0.7 ft.

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0 0.25 0.5 1 Miles



**Figure 4.3.3-2**  
**Floodplain Boundaries Federal Lands**  
**and Alternative B: Smaller Federal Parcel**  
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Yelp Creek flows out of the One Hundred Mile Swamp, while Yelp Creek and the Partridge River flow through portions of the federal lands. Collectively, the creek and river are 5.3 miles in length. Since both sides of the river provide riparian habitat, the length of the river on the federal lands was doubled to determine the importance of river frontage. It was determined that there were 55,968.0 linear ft of creek/river frontage on the federal lands. The length of creek/river frontage per acre of federal lands is 8.6 ft.

#### **4.3.3.1.2 Land Exchange Alternative B**

##### **Wetland Delineation and Classification**

Land Exchange Alternative B is a reduced area of the Land Exchange Proposed Action federal lands boundary, and the wetland delineation and classification is the same as described in Section 4.3.3.1.1. The Land Exchange Alternative B is 4,752.6 acres (see Figure 4.3.3-1).

##### **Hydrology, Wetland Vegetation, and Community Types**

The hydrology, wetland vegetation, and community types of the smaller federal parcel are a subset of the Land Exchange Proposed Action federal lands, and the hydrology, wetland vegetation, and community types are the same as described above in Section 4.3.3.1.1. The wetland assessment identified 143 wetlands covering 2,860.9 acres (60 percent) within the 4,752.6 acre smaller federal parcel boundary (see Figure 4.3.3-1). Table 4.3.3-1, above, summarizes the wetland areas within the Land Exchange Alternative B parcel represented by each Eggers and Reed (1997; 2014) wetland community type. A large portion of the wetlands within the Alternative B: Smaller Federal Parcel is located in the floodplains of Yelp Creek and the Partridge River or one of their associated tributaries. The most common wetland types within the Land Exchange Alternative B include coniferous bogs (approximately 59 percent), coniferous swamps (17 percent), and shrub swamps (approximately 14 percent), which includes alder thickets and shrub-carrs.

Other wetland community types present within the Land Exchange Alternative B include open bog, hardwood swamps, shallow marsh, and sedge/wet meadows. The sedge/wet meadows may receive some portion of its hydrology from groundwater. The shallow marsh community generally results from artificial impoundment by beaver dams, roads, and railroads and is primarily dependent on surface waters for hydrology.

##### **Wetland Functional Assessment**

Land Exchange Alternative B is a subset of the Land Exchange Proposed Action federal lands, and the wetland function and values assessment is the same as described in Section 4.3.3.1.1.

##### **Floodplains**

The Land Exchange Alternative B federal lands are within a portion of St. Louis County that is unmapped by FEMA. Therefore, there is no FEMA estimate of the areas of inundation and there are no FEMA-mapped floodplains on the federal lands. However, a hydrologic model (XP-SWMM) was developed as part of the hydrologic analysis needed for the design of the NorthMet Project Proposed Action. The area of inundation associated with the 500-year (or 0.2 percent chance) floodplain of the Partridge River was estimated as part of this analysis. This estimate of the floodplain area in the federal lands was used for the effects analysis. The

unmapped floodplain area on the federal lands associated with the Partridge River and Yelp Creek, estimated using the XP-SWMM, was estimated to total 1,412.9 acres of floodplain (500-year floodplain) (see Figure 4.3.3-2). The ratio of the number of acres of floodplain per acre of parcel for the Land Exchange Alternative B is 0.3.

### **Frontage of Waterways**

A portion of Mud Lake, 8.9 acres, is located within the Land Exchange Alternative B. The portion of Mud Lake was determined to have a frontage of approximately 1,200 ft. The length of lake frontage per acre of the Land Exchange Alternative B is 0.3 ft.

As with the Land Exchange Proposed Action, Yelp Creek flows out of the One Hundred Mile Swamp, while Yelp Creek and the Partridge River flow through portions of the Land Exchange Alternative B. Collectively, the creek and river are 5.3 miles in length in the Land Exchange Alternative B, corresponding to 55,968.0 linear ft of creek/river frontage (counting both sides of the water feature). The length of creek/river frontage per acre of the Land Exchange Alternative B is 11.8 ft.

### **4.3.3.2 Non-federal Lands**

#### **4.3.3.2.1 Non-federal Lands**

The Land Exchange Proposed Action must comply with two EOs that are related to wetlands and floodplains. EO 11990 was signed by President Jimmy Carter on May 24, 1977 “in order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modifications of wetlands....” This order applies to land exchanges such that, as much as practicable, the exchange does not result in the loss of wetland resources. EO 11988 was signed by President Jimmy Carter on May 24, 1977 “in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative...” This order applies to land exchanges such that, as much as practicable, the exchange does not result in an increase in the flood damage potential.

The USFS policy is that the following three conditions satisfy the requirements of EOs 11990 and 11988 (FSH 5409.13 § 33.43c):

1. The value of the wetlands or floodplains for properties received and conveyed is equal (balancing test) and the land exchange is in the public interest.
2. Reservations or restrictions are retained on the unbalanced portion of the wetlands and floodplains on the federal lands when the land exchange is in the public interest but does not meet the balancing test.
3. The federal property is removed from the exchange proposal when the conditions described in the preceding paragraphs 1 or 2 cannot be met.

The USFS is also required, by both EOs 11990 and 11988, to reference in a conveyance those uses that are restricted under identified federal, state, or local wetland and floodplain regulations. In Minnesota, the CWA (USACE/EPA/MPCA), Protected Waters Permit Program (MDNR), and the WCA regulate certain activities in wetlands. Floodplain management ordinances are administered at the local (county) level.

In addition to the evaluating wetlands in accordance with these EO's (acres for acres of wetland and no increase in flood hazards), analysis for the Land Exchange Proposed Action includes information on wetland community types as well as the ecological floodplain. Furthermore, the analysis evaluates the net change of shoreline frontage along rivers, streams, and lakes. Although such analysis is not required by EO 11990, it is consistent with the USFS's strategic goal to sustain and enhance outdoor recreation opportunities and with the management direction to protect water resources.

### **Wetland Delineation and Classification**

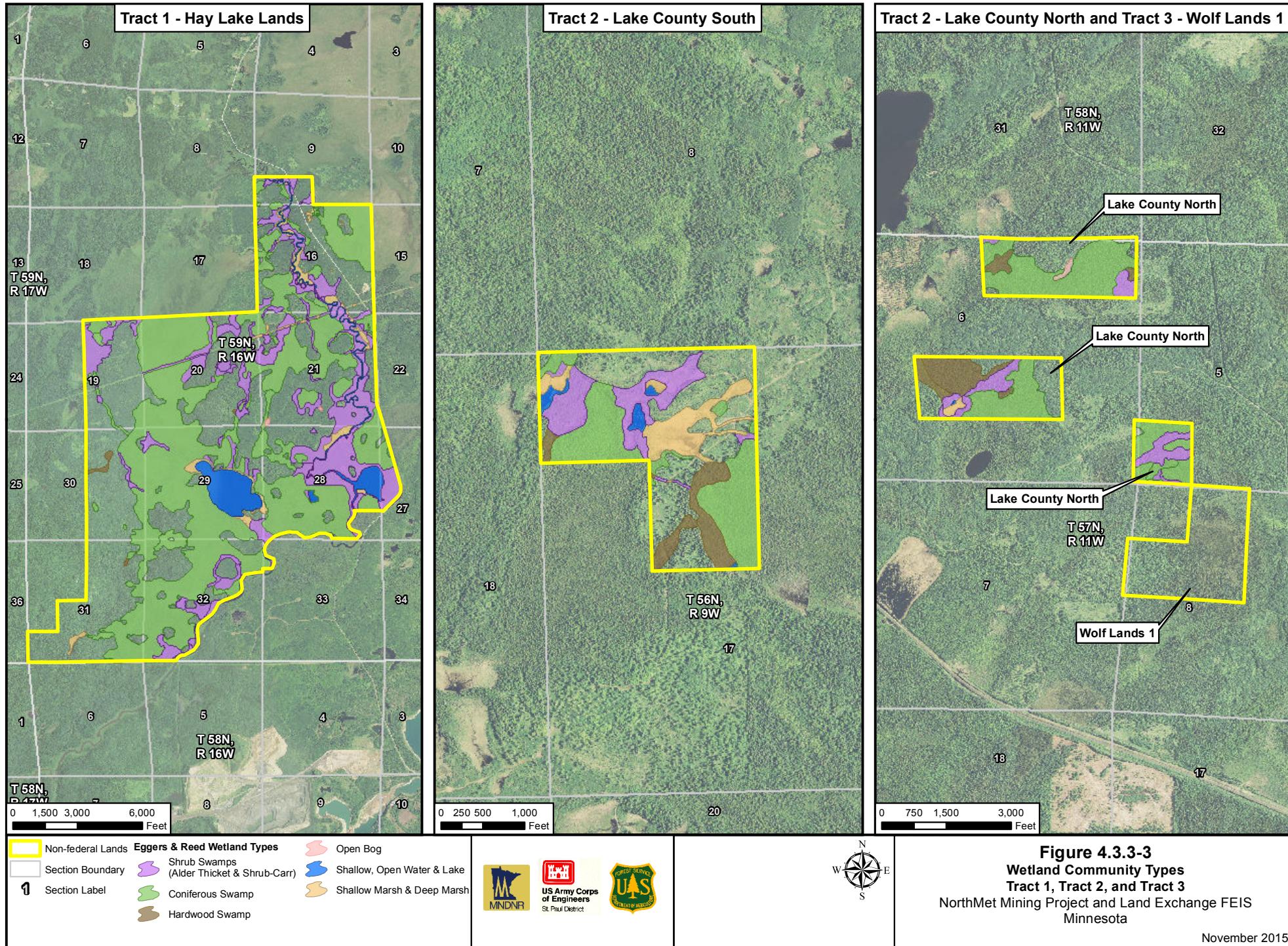
Wetland boundaries and community types for the non-federal lands were identified from aerial photographic interpretation and field studies; no federal or state delineation protocols were used, as it was primarily a habitat assessment (AECOM 2011b; AECOM 2011c). Infrared and true color aerial photographs and topographic maps of the parcels were reviewed to identify areas that could have wetlands based on vegetative characteristics and topography. In addition, wetlands identified by the NWI were overlaid onto aerial photographs to assist in wetland identification. Field studies were conducted subsequent to the initial desktop study in June 2009 for the Hay Lake Lands and McFarland Lands (AECOM 2011b) and in November 2010 for the Hunting Club Lands, Lake County Lands, and Wolf Lands (AECOM 2011c); this was done to better delineate wetland boundaries on the parcels using the same methods as used for the federal lands surrounding the Mine Site. Mapping information from the field work was then used to modify the NWI wetland types and boundaries.

Wetland surveys were conducted along transects located on primary roads (parcel access and logging) and secondary access routes (skid trails, stream corridors, wetlands, other natural corridors) in order to maximize the amount of area covered during the survey period. Additional surveys were conducted off of the primary and secondary access routes in an effort to better determine wetland boundaries and types (AECOM 2011b; 2011c).

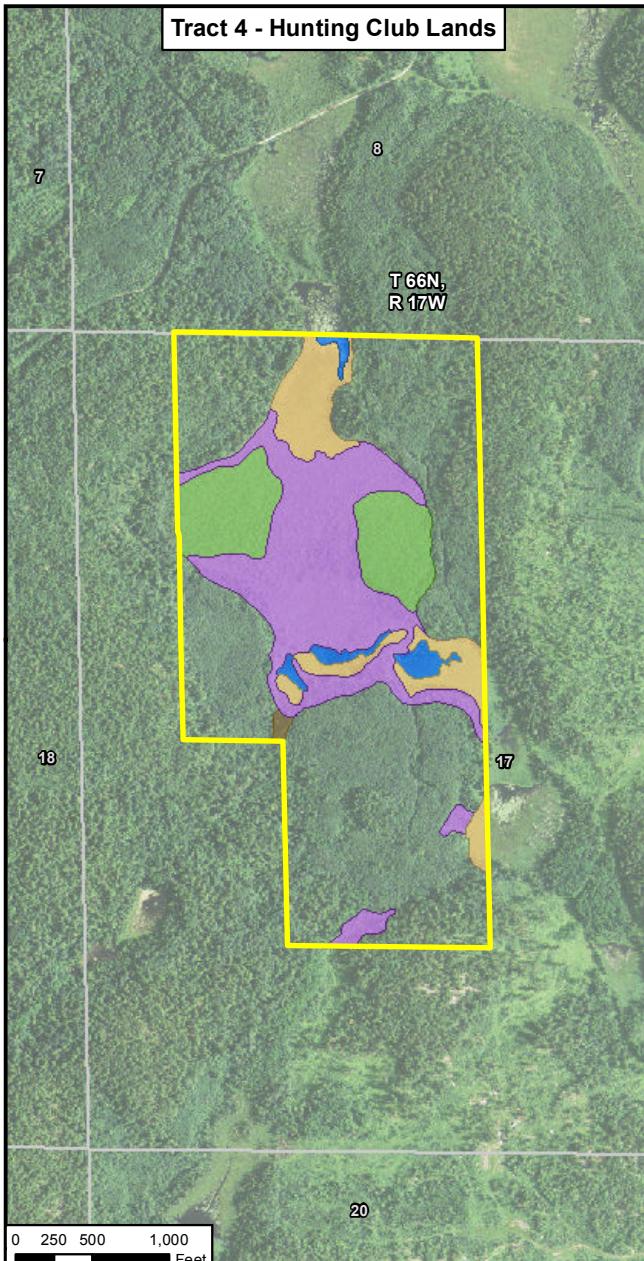
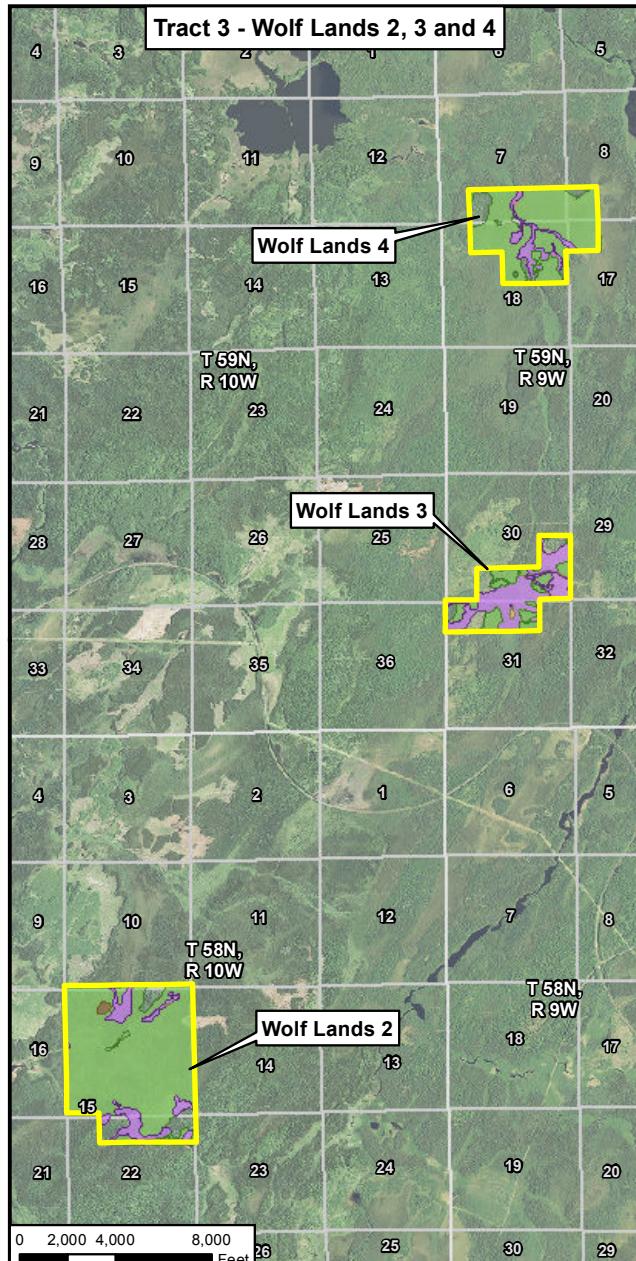
The boundaries of wetlands were determined based on aerial photograph interpretation and NWI mapping, with some refining of wetland boundaries during field studies. Wetland boundaries were determined in the field based on hydrologic and vegetative characteristics and were more accurate where survey routes crossed or were near wetland boundaries. Approximate wetland boundaries and wetland types based on habitat mapping are shown on Figures 4.3.3-3 and 4.3.3-4. Surveys covered nearly all portions of the parcels, although not all wetlands were field surveyed (AECOM 2011b; AECOM 2011c).

During the field surveys in June 2009 and November 2010, data were collected using the guidelines in MnRAM 3.2 (BWSR 2009) related to the functions and values of representative wetlands within the tracts (AECOM 2011b; AECOM 2011c). The primary wetland functions were evaluated based on a review of the: 1) wetland soil, hydrology, and vegetation; 2) outlet characteristics; 3) watershed and adjacent upland land uses and conditions; 4) erosion and sedimentation; and 5) human disturbances. The Eggers and Reed (1997; 2014) classification system was used to classify wetland communities for the wetland function and value evaluation. Landscape factors were typically evaluated on a larger scale. For instance, soil and vegetation conditions within the watershed were usually similar for large groups of wetlands. The anthropogenic factors were also typically similar across broad areas. Based on the responses to questions addressed by MnRAM 3.2 and the assessment of special features, a function value of

high, medium, or low was given for each primary function (AECOM 2011b; AECOM 2011c). See below for more information on MnRAM scoring for the non-federal lands.



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|                                           |                             |
|-------------------------------------------|-----------------------------|
| Non-federal Lands                         | Eggers & Reed Wetland Types |
| Section Boundary                          | Section Label               |
| Shrub Swamps (Alder Thicket & Shrub-Carr) | Open Bog                    |
| Coniferous Swamp                          | Shallow, Open Water & Lake  |
| Hardwood Swamp                            | Shallow Marsh & Deep Marsh  |



**Figure 4.3.3-4**  
**Wetland Community Types**  
**Tract 3, Tract 4, and Tract 5**  
 NorthMet Mining Project and Land Exchange FEIS  
 Minnesota

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### **Hydrology, Wetland Vegetation, and Community Types**

Habitat and wetland community types within the five tracts were found to be consistent with habitats in much of the Mesabi Iron Range and northeastern Minnesota, including coniferous, deciduous, and mixed coniferous and deciduous forests, and a variety of wetland habitats. Generally, the parcels consisted of a mosaic of slightly elevated upland areas surrounded by wetland areas.

The surveys identified that the majority of the tracts' total area consists of wetlands (66 percent; 4,669.9 acres). Individual tracts with a higher percentage of upland areas include the Hunting Club parcel (60 percent upland), Hay Lake (41 percent upland), and McFarland Lake (100 percent upland) (see Table 4.3.3-3). The most common wetland types within the five non-federal tracts are coniferous swamps (approximately 69 percent) and shrub swamps (approximately 23 percent), which includes both alder thickets and shrub-carr wetlands. Wetland types based on Eggers and Reed (1997; 2014) classification system for the non-federal lands are presented in Table 4.3.3-4 below (AECOM 2011b; AECOM 2011c).

***Table 4.3.3-3 Total Wetland and Upland Acreage for the Non-federal Lands***

| Tract                    | Wetland            | Upland             | Total              | % of Wetlands | % of Upland |
|--------------------------|--------------------|--------------------|--------------------|---------------|-------------|
|                          | Acres <sup>1</sup> | Acres <sup>1</sup> | Acres <sup>1</sup> |               |             |
| Tract 1 – Hay Lake       | 2,930.8            | 1,995.6            | 4,926.4            | 59            | 41          |
| Tract 2 – Lake County    |                    |                    |                    |               |             |
| Lake County North        | 209.3              | 55.9               | 265.2              | 79            | 21          |
| Lake County South        | 73.6               | 43.4               | 117.0              | 63            | 37          |
| Tract 3 – Wolf Lands     |                    |                    |                    |               |             |
| Wolf Lands 1             | 90.4               | 35.4               | 125.8              | 72            | 28          |
| Wolf Lands 2             | 706.2              | 61.5               | 767.7              | 92            | 8           |
| Wolf Lands 3             | 233.2              | 44.3               | 277.5              | 84            | 16          |
| Wolf Lands 4             | 362.8              | 41.9               | 404.7              | 90            | 10          |
| Tract 4 - Hunting Club   | 63.6               | 96.5               | 160.1              | 40            | 60          |
| Tract 5 – McFarland Lake | 0.0                | 30.8               | 30.8               | 0             | 100         |
| Total                    | 4,669.9            | 2,405.3            | 7,075.2            | 66            | 34          |

Note:

<sup>1</sup> Total acres may be more or less than presented due to rounding.

***Table 4.3.3-4 Total Wetland Acreage by Wetland Type for the Non-federal Lands***

| Eggers and Reed Class <sup>1</sup>                   | Total Non-federal Lands |     |
|------------------------------------------------------|-------------------------|-----|
|                                                      | Acres                   | %   |
| Coniferous swamp <sup>2</sup>                        | 3,242.4                 | 69  |
| Hardwood swamp <sup>3</sup>                          | 58.0                    | 1   |
| Open bog                                             | 7.1                     | <1  |
| Open water (includes shallow, open water, and lakes) | 182.5                   | 4   |
| Shallow marsh <sup>4</sup>                           | 117.5                   | 3   |
| Shrub swamp (includes alder thicket and shrub-carr)  | 1,062.4                 | 23  |
| Total                                                | 4,669.9                 | 100 |

Notes:

<sup>1</sup> Eggers and Reed 1997; 2014.

<sup>2</sup> Field data for coniferous bogs and coniferous swamps was combined.

<sup>3</sup> Coniferous tree species may be present within some hardwood swamps.

<sup>4</sup> Shallow marsh areas may contain deep marshes.

### **Wetlands Functional Assessment**

Wetland functions and values for the non-federal lands were determined during the June 2009 and November 2010 field surveys. Wetland functions and values were evaluated at 64 sites within the five non-federal tracts (AECOM 2011b; AECOM 2011c; AECOM 2011d). The wetlands on the five non-federal lands share characteristics similar to those found on the federal lands. All wetlands on the non-federal lands were rated high for most wetland functions and values.

During the field surveys, data were collected related to the functions and values of representative wetland locations. A few survey locations were for individual wetlands, while for larger wetland complexes several locations were surveyed. An attempt was made to survey a variety of wetland types across the entire parcel (AECOM 2011b; AECOM 2011c). Survey locations for the wetland functions and values assessment are shown on Figures 4.3.3-3 through 4.3.3-4.

Table 4.3.3-5 summarizes the functional value ratings for the 64 wetlands that were evaluated for primary wetland functions rated by MnRAM 3.2. Wetlands were rated high for nearly all wetland functional values. Vegetation diversity/integrity was rated high for all wetlands. The overall rating for vegetation diversity/integrity was based on the highest rated community for vegetation diversity and integrity, rather than the average or weighted value for community vegetation diversity and integrity. MnRAM 3.2 guidance states that this is the appropriate measure for assessing wetland quality for regulatory purposes.

According to MnRAM scores (AECOM 2011b; AECOM 2011c), the following ratings were determined:

- Wetland hydrology and water quality were rated high for all wetlands, and high for all wetlands except three for downstream water quality. Most wetlands on Tracts 1 and 5 provide moderate to high flood attenuation value and most wetlands on Tracts 2, 3, and 4 provide moderate flood attenuation value, with two wetlands rated high for this function.
- Wildlife habitat was rated high for all but one wetland, as natural wildlife corridors and upland communities are relatively untouched by recent human disturbances or effects. There are no barriers to wildlife movement. Wildlife habitat was rated moderate in an area where there are few plant communities and large amounts of water.
- Fish habitat was rated high for wetlands that provide fish habitat. Fish habitat was rated as not applicable for some wetlands where the wetland does not have enough standing water throughout the year to support fish. Some other characteristics that might limit wetland value for fish would include isolated wetlands that are not permanently flooded, or forested wetlands where the water table is below the surface for all or part of the year.
- Amphibian habitat was rated high for most wetlands. This indicated that the wetland stays inundated long enough in most years to allow amphibians to successfully reproduce. Amphibian habitat was rated medium for some wetlands if ideal conditions needed to support amphibian reproduction do not occur at the parcels. Forested wetlands with little or no standing water or not enough woody vegetation during the mating season would likely not support amphibians. Wetlands with predatory fish may also not support amphibians. Other wetlands were rated not applicable for amphibian habitat, indicating that the parcel is not inundated long enough in most years to support successful breeding.

- Aesthetic, recreational, educational, and cultural values were rated medium for all but one wetland. All wetlands are aesthetically pleasing, and could be used for recreation, education, and cultural purposes. However, access by the general public access is limited to overland by foot or on snowmobile/all-terrain vehicle from Pike River Road or from USFS roads. A few wetlands have human influences on the viewshed due to close proximity to Pike River Road; however, due to their remote locations, most of the wetlands have little human influence on the viewshed.

**Table 4.3.3-5    Wetland Functional Value Assessment for the Non-federal Lands**

| Wetland Functions and Value Rating | Functional Value Ratings (%)    |           |                   |                          |                       |                  |              |                   |                                 |  |
|------------------------------------|---------------------------------|-----------|-------------------|--------------------------|-----------------------|------------------|--------------|-------------------|---------------------------------|--|
|                                    | Vegetation Diversity/ Integrity | Hydrology | Flood Attenuation | Downstream Water Quality | Wetland Water Quality | Wildlife Habitat | Fish Habitat | Amphibian Habitat | Aesthetics/ Education/ Cultural |  |
| High                               | 100                             | 100       | 8                 | 97                       | 100                   | 98               | 55           | 69                | 2                               |  |
| Moderate                           | 0                               | 0         | 92                | 3                        | 0                     | 2                | 0            | 9                 | 98                              |  |
| Low                                | 0                               | 0         | 0                 | 0                        | 0                     | 0                | 0            | 6                 | 0                               |  |
| Not Available or Applicable        | 0                               | 0         | 0                 | 0                        | 0                     | 0                | 45           | 16                | 0                               |  |
| Total                              | 100                             | 100       | 100               | 100                      | 100                   | 100              | 100          | 100               | 100                             |  |

Sources: AECOM 2011b; AECOM 2011c.

#### 4.3.3.2.2 Tract 1 – Hay Lake Lands

##### **Hydrology, Wetland Vegetation, and Community Types**

Tract 1 is moderately hilly and consists primarily of second- or third-growth deciduous and coniferous forest uplands and emergent, shrub swamp, and forested wetlands. This parcel is adjacent to the Superior National Forest (AECOM 2011b). The wetland assessment identified 2,930.8 acres of wetlands within Tract 1 (approximately 59 percent of the land area) (see Figure 4.3.3-3 and Table 4.3.3-6). The most common wetland types within Tract 1 are coniferous swamps (approximately 67 percent) and shrub swamps (approximately 24 percent), which includes both alder thickets and shrub-carr wetlands.

**Table 4.3.3-6 Total Wetland Acreage by Wetland Type for Tract 1**

| Eggers and Reed Class <sup>1</sup>                   | Total Hay Lake |     |
|------------------------------------------------------|----------------|-----|
|                                                      | Acres          | %   |
| Coniferous swamp <sup>2</sup>                        | 1,953.9        | 67  |
| Hardwood swamp <sup>3</sup>                          | 8.0            | <1  |
| Open bog                                             | 2.1            | <1  |
| Open water (includes shallow, open water, and lakes) | 176.6          | 6   |
| Shallow marsh <sup>4</sup>                           | 84.1           | 3   |
| Shrub swamp (includes alder thicket and shrub-carr)  | 706.1          | 24  |
| Total                                                | 2,930.8        | 100 |

Notes:

<sup>1</sup> Eggers and Reed 1997; 2014.

<sup>2</sup> Field data for coniferous bogs and coniferous swamps was combined.

<sup>3</sup> Coniferous tree species may be present within some hardwood swamps.

<sup>4</sup> Shallow marsh areas may contain deep marshes.

Wetlands on Tract 1 consist primarily of early successional coniferous swamps, shrub wetlands, and open water wetlands. Hay Lake, Rice Lake, an unnamed lake, and the Pike River are the dominant water features. Large bogs dominate much of the east-central portion of Tract 1. Several wetlands were created or enlarged due to impoundment of streams by beaver dams. Raised water levels resulted in stands of dead and dying spruce along portions of the Pike River (AECOM 2011b).

Bogs within Tract 1 are dominated by leatherleaf and bog Labrador-tea, with scattered young speckled alder, bog birch, tamarack, and in some areas, narrow-leaved cattail and sedges. Sphagnum and club moss often cover 80 to 90 percent of the bog. Scattered (less than 5 percent) black spruce (some dead) and immature tamarack are found in the tree layer. Lowbush blueberry, small-fruited bog cranberry, bog rosemary, and small willows are also common. Other species encountered include cottongrass, wild iris, wild raspberry, bunchberry, and northern bog orchid (AECOM 2011b).

Emergent wetlands are primarily limited to disturbed areas on Tract 1, floodplains associated with the Pike River, wetlands associated with abandoned logging roads, transmission line ROWs, and beaver ponds. These emergent wetlands are often dominated by Canada bluejoint grass, various sedge species, and narrow-leaved cattail (70 to 80 percent cover) and generally are characterized by water depths of 1 ft or greater. Spruce, tamarack, and northern white cedar associated with these wetlands are often killed when flooded due to the rising water level behind beaver dams. Willows, tamarack, red-osier dogwood, and speckled alder are often found along the border of these wetlands, but comprised less than 30 percent of the total cover. Wild iris is encountered in some wetlands, as is horsetail, bur reed, spikerush, water arum, broad-leaved arrowhead, and woolly sedge (AECOM 2011b).

Shrub swamp wetlands usually consist of a dense (60 to 90 percent) cover of speckled alder, meadowsweet, and bog birch, with alder often 6 ft or taller in height. Some of the wetlands have scattered black spruce, tamarack, and willow saplings, but tree cover does not exceed 25 percent. Dominant low shrubs are bog Labrador-tea, leatherleaf, lowbush blueberry, prickly rose, wild raspberry, and red-osier dogwood. Mountain maple saplings are also present in a few wetlands. Herbaceous layer species include club and sphagnum mosses, woolly sedge, Canada bluejoint grass, horsetail, bunchberry, and clintonia (AECOM 2011b).

Forested wetlands (coniferous and hardwood swamps) are dominated by black spruce and tamarack, with some scattered northern white cedar, red pine, and black ash also present. Coniferous wetland forests are the most common habitat type on the parcel; deciduous and mixed forest wetlands are uncommon. In some areas with dense stands of spruce, few shrubs are seen, but sphagnum and club mosses often cover nearly 100 percent of the ground. Some open stands have an understory comprised of shrubs and scattered sapling northern white cedar, tamarack, and black spruce, along with speckled alder and willow. Mountain maple is also encountered among tree species on Tract 1, primarily in deciduous and mixed forests. Common species encountered in the shrub layer include speckled alder, leatherleaf, bog Labrador-tea, lowbush blueberry, and bog birch. Species found near the ground include clintonia, bracken fern, horsetail, bunchberry, wild raspberry, cottongrass, wild sarsaparilla, wild strawberry, and false lily-of-the-valley. Forest and shrub cover typically range from 30 to 60 percent, while moss and other understory vegetation cover ranges from 50 to 90 percent (AECOM 2011b).

### **Wetland Functional Assessment**

Table 4.3.3-7 summarizes the 30 wetland functional value ratings that were obtained for Tract 1 for the primary wetland functions rated by MnRAM 3.2. Tract 1 wetlands were rated high for nearly all wetland functional values with the exception of flood attenuation and aesthetic, recreational, educational, and cultural values.

**Table 4.3.3-7    Wetland Functional Value Assessment for Tract 1**

| Wetland Functions and Value Rating | Functional Value Ratings (%)       |           |                   |                          |                       |                  |              |                   |                                       |  |
|------------------------------------|------------------------------------|-----------|-------------------|--------------------------|-----------------------|------------------|--------------|-------------------|---------------------------------------|--|
|                                    | Vegetation Diversity/<br>Integrity | Hydrology | Flood Attenuation | Downstream Water Quality | Wetland Water Quality | Wildlife Habitat | Fish Habitat | Amphibian Habitat | Aesthetics/<br>Education/<br>Cultural |  |
| High                               | 100                                | 100       | 13                | 93                       | 100                   | 97               | 53           | 87                | 0                                     |  |
| Moderate                           | 0                                  | 0         | 87                | 7                        | 0                     | 3                | 0            | 3                 | 100                                   |  |
| Low                                | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 10                | 0                                     |  |
| Not Available or Applicable        | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 47           | 0                 | 0                                     |  |
| Total                              | 100                                | 100       | 100               | 100                      | 100                   | 100              | 100          | 100               | 100                                   |  |

Source: AECOM 2011b.

### **Floodplains**

Non-federal and non-state-owned lands mapped as floodplains are regulated by a county floodplain overlay zoning district. In St. Louis County, the mapped floodplains are regulated by the County Floodplain Ordinance. The only non-federal parcel with a mapped floodplain identified in the existing effective FEMA FIRM is located in St. Louis County for Tract 1 along the Pike River. The mapped floodplain was not part of a detailed study area along the Pike River and the area of floodplain has been estimated on the FIRM. Tract 1 also has unmapped floodplains associated with Hay Lake itself (Figure 4.3.3-5) (AECOM 2011d). The mapped floodplain has been estimated to be approximately 376.2 acres, while the unmapped area including and near Hay Lake has been estimated to be approximately 175.0 acres. The total

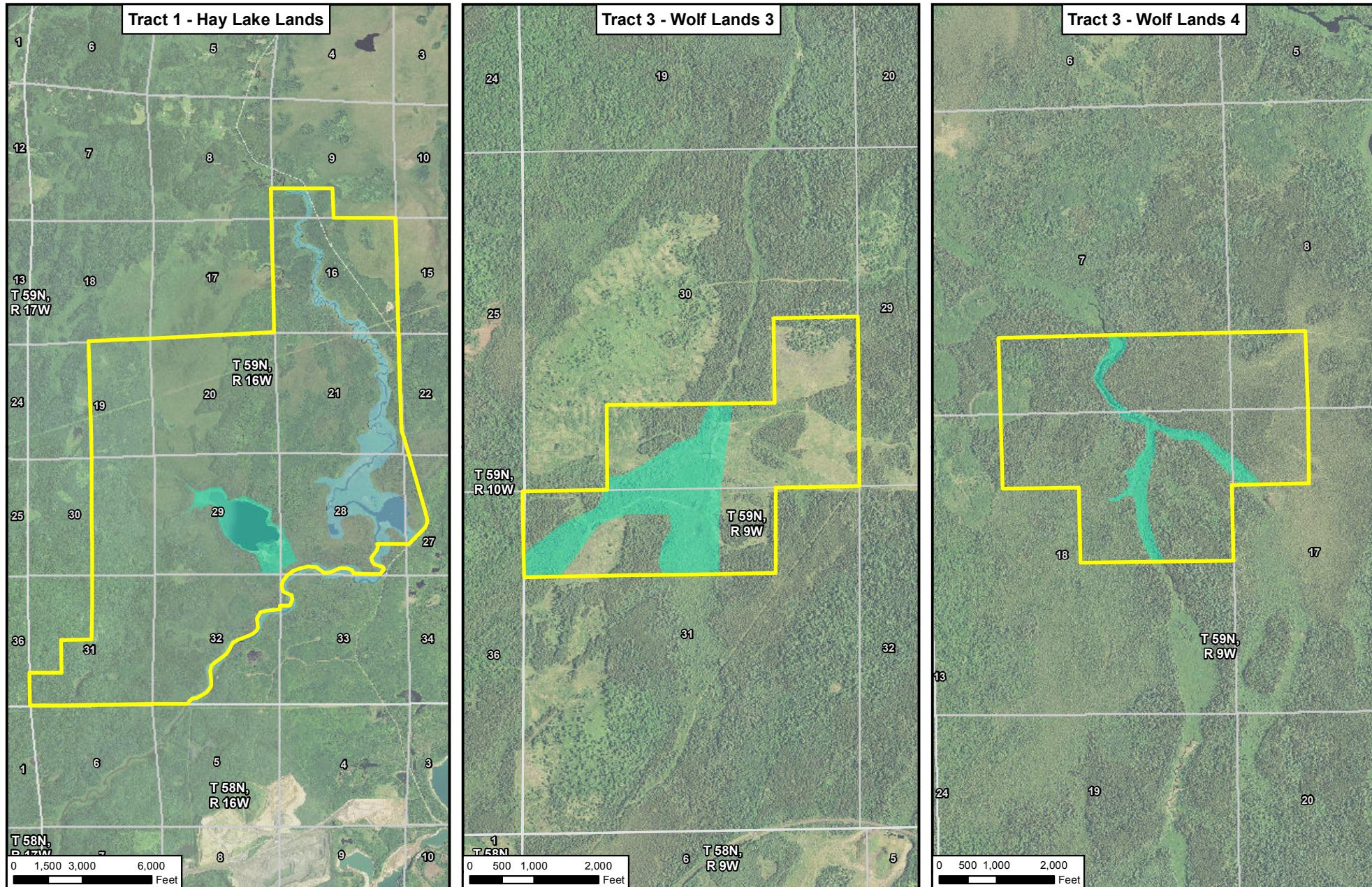
floodplain associated with Tract 1 is approximately 551.2 acres. The ratio of the number of acres of floodplain per acre of parcel for Tract 1 is 0.11.

**Frontage of Waterways**

Within Tract 1, Hay Lake, 96.2 acres, has a frontage of 9,894.4 ft. Rice Lake, 29.5 acres, has a frontage of 4,829.6 ft. An unnamed lake between Hay Lake and Rice Lake is 3.9 acres in area and has a frontage of approximately 1,700 ft.

The Pike River flows from the southern boundary to the northern boundary of Tract 1 and is 8.1 miles in length. Riparian habitat is found on both sides of the river for 5.7 miles, and on only one side for 2.4 miles where the river formed the boundary of the parcel. The linear distance of river frontage for Tract 1 is approximately 72,864 linear ft (AECOM 2011d).

The length of lake and river frontage per acre on Tract 1 was calculated to be 3.5 ft per acre and 15.3 ft per acre, respectively.



|          |                     |
|----------|---------------------|
|          | Non-federal Lands   |
|          | Section Boundary    |
| <b>1</b> | Section Label       |
|          | Mapped Floodplain   |
|          | Unmapped Floodplain |



**Figure 4.3.3-5**  
**Floodplain Boundaries**  
**Tract 1 and Tract 3**  
 NorthMet Mining Project and Land Exchange FEIS  
 Minnesota

November 2015

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### 4.3.3.2.3 Tract 2 – Lake County Lands

#### ***Hydrology, Wetland Vegetation, and Community Types***

Tract 2 consists of 381.9 acres located in Lake County and is comprised of two parcels. Tract 2 identified 282.9 acres of wetlands (74 percent of Tract 2) (see Figure 4.3.3-3 and Table 4.3.3-8). The most common wetland types within Tract 2 are coniferous swamps (approximately 59 percent); shrub swamps (approximately 18 percent), which includes both alder thickets and shrub-carr wetlands; and hardwood swamps, which includes some coniferous swamps (approximately 16 percent). The two parcels (Lake County North and Lake County South) are nearly level and consist predominantly of second- and third-growth mixed deciduous and coniferous forest uplands and bog, emergent, shrub, and forested wetlands. Much of the Lake County South parcel has been recently logged (AECOM 2011c; AECOM 2011d).

#### ***Lake County North***

The Lake County North parcel consists of 265.0 acres, of which 209.3 acres are identified as wetlands (approximately 79 percent) (see Figure 4.3.3-3 and Table 4.3.3-8). The most common wetland types within the Lake County North parcel are coniferous swamps (approximately 65 percent); shrub swamps (approximately 17 percent), which includes alder thickets and shrub-carr wetlands; and hardwood swamps, which includes some coniferous swamps (approximately 17 percent).

***Table 4.3.3-8 Total Wetland Acreage by Wetland Type for Tract 2***

| Eggers and Reed Class <sup>1</sup>                   | Lake County North |     | Lake County South |     | Total Lake County |     |
|------------------------------------------------------|-------------------|-----|-------------------|-----|-------------------|-----|
|                                                      | Acres             | %   | Acres             | %   | Acres             | %   |
| Coniferous swamp <sup>2</sup>                        | 135.0             | 65  | 32.4              | 44  | 167.4             | 59  |
| Hardwood swamp <sup>3</sup>                          | 34.7              | 17  | 9.9               | 13  | 44.6              | 16  |
| Open bog                                             | 1.8               | 1   | 0.0               | 0   | 1.8               | 1   |
| Open water (includes shallow, open water, and lakes) | 0.2               | <1  | 2.5               | 3   | 2.7               | 1   |
| Shallow marsh <sup>4</sup>                           | 2.5               | 1   | 12.3              | 17  | 14.8              | 5   |
| Shrub swamp (includes alder thicket and shrub-carr)  | 35.1              | 17  | 16.5              | 22  | 51.6              | 18  |
| Total                                                | 209.3             | 100 | 73.6              | 100 | 282.9             | 100 |

Notes:

<sup>1</sup> Eggers and Reed 1997, 2014.

<sup>2</sup> Field data for coniferous bogs and coniferous swamps was combined.

<sup>3</sup> Coniferous tree species may be present within some hardwood swamps.

<sup>4</sup> Shallow marsh areas may contain deep marshes.

The Lake County North parcel has moderate topography, with the terrain generally sloping toward the southwest toward Pine Lake. This parcel consists of two smaller subparcels to the north and a single, small subparcel to the south that is adjacent to the Wolf Lands 1 parcel (see Figure 4.3.3-3). The subparcels are comprised of mostly wetland habitat, except for an area of upland habitat in the northern portion of the northern subparcel and in portions of the southern subparcel. Portions of the subparcels have recently been logged. Wetland habitat consists mostly of immature coniferous forest, with lesser amounts of mature mixed forest and shrubland (AECOM 2011c).

The Lake County North parcel encompasses several wetland types, including forested wetlands comprised of coniferous swamps and hardwood swamps, shrub swamps, and open bog/palustrine emergent wetlands, open water, and shallow marshes (collectively, emergent wetlands). Forested wetlands are comprised primarily of sapling northern white cedar and black spruce with lesser amounts of tamarack, although several drainages also contain black ash. Northern white cedar is predominant in the more southerly portions of the northern two subparcels, while black spruce is more common in the northern and northwestern portion of these two subparcels. Shrub wetland habitat is associated with several drainages, a beaver pond, a bog area, and recently logged areas, while emergent wetland habitat is found near the beaver pond and in recently logged areas. Shrub wetlands within the Lake County North parcel are dominated by speckled alder. Vegetation in the emergent wetlands consists of various sedge species and Canada bluejoint grass, with scattered black spruce, northern white cedar, tamarack, and speckled alder (AECOM 2011c).

Canopy cover in forested wetlands ranges from 50 to 80 percent and most canopy trees are 6 to 10 inches dbh. The midstory consists of balsam fir and black spruce (approximately 40 percent cover), while speckled alder, leatherleaf, and bog Labrador-tea are found in the shrub layer (40 percent cover) and club moss and sphagnum moss cover most of the ground (AECOM 2011c).

In general, the southern subparcel consists of forested wetland stands of immature black spruce and northern white cedar with northern white cedar to 20 inches dbh and black spruce to 14 inches dbh. Canopy cover is 50 percent, while the midstory cover is 60 percent and comprised of sapling balsam fir. The nearly continuous ground cover is dominated by sphagnum moss and club moss. Another immature forested wetland in the northern subparcel includes black ash trees to 16 inches dbh (AECOM 2011c).

Shrub and emergent wetland habitats are also found on the subparcels. Shrub wetland habitat is associated with several drainages, a beaver pond, a bog area, and recently logged areas, while emergent wetland habitat is found near the beaver pond and in recently logged areas. Shrub wetlands are dominated by speckled alder (to 80 percent cover). Two wetlands are classified as shrub wetlands because speckled alder covered 70 percent of the area, but the wetlands also have open bog characteristics since bog Labrador-tea also covers 70 to 80 percent of the wetlands, and sphagnum moss covers most of the ground. Scattered sapling black spruce, northern white cedar, and red-osier dogwood are also found in these wetlands. Vegetation in the emergent wetlands consists of various sedge species and Canada bluejoint (40 percent cover), with scattered black spruce, northern white cedar, tamarack, and speckled alder (AECOM 2011c).

### ***Lake County South***

The Lake County South parcel consists of 116.9 acres, of which 73.6 acres are identified as wetlands (approximately 63 percent) (see Figure 4.3.3-3 and Table 4.3.3-8). The most common wetland types within the Lake County South parcel are coniferous swamps (approximately 44 percent); shrub swamps (approximately 22 percent), which includes both alder thickets and shrub-carr wetlands; shallow marshes (approximately 17 percent); and hardwood swamps (approximately 13 percent).

Lake County South is relatively flat in the northwestern section, rises in elevation to the northeast, and then falls in elevation to the southeast. Water flows from west to east. At the time

of the survey, a series of beaver dams and ponds dominated the landscape, as did areas that had been recently logged. Although shrubland dominates upland habitats, several habitat types comprise wetland habitats within this parcel (AECOM 2011c).

Forested wetlands dominate the western and southeastern portions of the parcel and are comprised of black spruce and northern white cedar. However, tamarack is found in some forest stands and black ash is an important component of several drainages. The overstory cover is about 50 to 70 percent, while the midstory coverage of balsam fir and black spruce is about 20 percent. Speckled alder, leatherleaf, bog Labrador-tea, and red-osier dogwood are common shrubs (to 80 percent cover), while sphagnum moss covers most of the ground. Forests in the northwestern section contain a dense mix of northern white cedar and black spruce with scattered black ash in the canopy (50 percent cover), and black spruce, northern white cedar, balsam fir, and speckled alder in the midstory and shrub layer (80 percent cover). Five beaver ponds were found on the parcel creating wetlands, which are comprised of open water with scattered dead spruce. These open-water wetlands are surrounded by emergent wetlands dominated by various sedge species, narrow-leaved cattail, woolgrass, and Canada bluejoint grass, or by dense stands of speckled alder in more shallow areas (AECOM 2011c).

### **Wetland Functional Assessment**

Table 4.3.3-9 summarizes the 13 wetland functional value ratings (8 Lake County North and 5 Lake County South) that were obtained for Tract 2 for the primary wetland functions rated by MnRAM 3.2. Tract 2 wetlands were rated high for nearly all wetland functional values with the exception of flood attenuation and aesthetic, recreational, educational, and cultural values.

**Table 4.3.3-9    Wetland Functional Value Assessment for Tract 2**

| Wetland Functions and Value Rating | Functional Value Ratings (%)       |           |                   |                          |                       |                  |              |                   |                                       |
|------------------------------------|------------------------------------|-----------|-------------------|--------------------------|-----------------------|------------------|--------------|-------------------|---------------------------------------|
|                                    | Vegetation Diversity/<br>Integrity | Hydrology | Flood Attenuation | Downstream Water Quality | Wetland Water Quality | Wildlife Habitat | Fish Habitat | Amphibian Habitat | Aesthetics/<br>Education/<br>Cultural |
| <b>Lake County North</b>           |                                    |           |                   |                          |                       |                  |              |                   |                                       |
| High                               | 100                                | 100       | 0                 | 100                      | 100                   | 100              | 63           | 63                | 0                                     |
| Moderate                           | 0                                  | 0         | 100               | 0                        | 0                     | 0                | 0            | 0                 | 100                                   |
| Low                                | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 0                 | 0                                     |
| Not Available or Applicable        | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 37           | 37                | 0                                     |
| Total                              | 100                                | 100       | 100               | 100                      | 100                   | 100              | 100          | 100               | 100                                   |
| <b>Lake County South</b>           |                                    |           |                   |                          |                       |                  |              |                   |                                       |
| High                               | 100                                | 100       | 0                 | 100                      | 100                   | 100              | 60           | 60                | 20                                    |
| Moderate                           | 0                                  | 0         | 100               | 0                        | 0                     | 0                | 0            | 0                 | 80                                    |
| Low                                | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 0                 | 0                                     |
| Not Available or Applicable        | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 40           | 40                | 0                                     |
| Total                              | 100                                | 100       | 100               | 100                      | 100                   | 100              | 100          | 100               | 100                                   |

Source: AECOM 2011c.

### **Floodplains**

Lake County has an older Flood Hazard Boundary Map developed by the HUD to estimate the areas of frequent inundation. FEMA rescinded the map in 1985 and it is not considered to be an effective FEMA FIRM map; therefore, it is not used as part of the management of flood-prone areas. Lake County does not have a floodplain overlay ordinance; therefore, there are no “regulatory floodplains” within Lake County. While the floodplains identified using the older map are not considered to be the effective FEMA FIRM maps of flood-prone areas, they can offer an approximation of floodplains within the county for the effects analysis.

Mapped floodplain identification for the effects analysis of non-federal lands in Lake County was done using this older, rescinded map and it was determined that Tract 2 has no mapped or unmapped floodplains.

### **Frontage of Waterways**

Tract 2 does not include any streams, rivers, creeks, or lakes.

#### **4.3.3.2.4 Tract 3 – Wolf Lands**

##### **Hydrology, Wetland Vegetation, and Community Types**

Tract 3 consists of a total of 1,575.8 acres located in Lake County and is comprised of four individual parcels. A total of 1,392.6 acres (88 percent) of wetlands were identified within Tract 3 (see Figures 4.3.3-3 and 4.3.3-4, and Table 4.3.3-10). The most common wetland types within the Wolf Lands are coniferous swamps (approximately 79 percent) and shrub swamps (approximately 20 percent), which includes alder thickets and shrub-carr wetlands. The four parcels are nearly level and consist predominantly of second- and third-growth mixed deciduous and coniferous forested uplands and bog, emergent, shrub, and forested wetlands. Much of the area of the parcels comprising the Wolf Lands has been recently logged (AECOM 2011c; AECOM 2011d).

**Table 4.3.3-10 Total Wetland Acreage by Wetland Type for Tract 3**

| Eggers and Reed Class <sup>1</sup>                   | Wolf Lands 1 |     | Wolf Lands 2 |     | Wolf Lands 3 |     | Wolf Lands 4 |     | Total Wolf Lands |     |
|------------------------------------------------------|--------------|-----|--------------|-----|--------------|-----|--------------|-----|------------------|-----|
|                                                      | Acres        | %   | Acres        | %   | Acres        | %   | Acres        | %   | Acres            | %   |
| Coniferous swamp <sup>2</sup>                        | 75.4         | 84  | 627.4        | 89  | 82.6         | 35  | 320.3        | 88  | 1,105.7          | 79  |
| Hardwood swamp <sup>3</sup>                          | 0.0          | 0   | 5.0          | 1   | 0.0          | 0   | 0.0          | 0   | 5.0              | <1  |
| Open bog                                             | 3.0          | 3   | 0.0          | 0   | 0.0          | 0   | 0.2          | <1  | 3.2              | <1  |
| Open water (includes shallow, open water, and lakes) | 0.0          | 0   | 0.4          | <1  | 0.0          | 0   | 0.0          | 0   | 0.4              | <1  |
| Shallow marsh <sup>4</sup>                           | 0.0          | 0   | 0.4          | <1  | 5.2          | 2   | 0.0          | 0   | 5.6              | <1  |
| Shrub swamp (includes alder thicket and shrub-carr)  | 12.0         | 13  | 73.0         | 10  | 145.4        | 63  | 42.3         | 12  | 272.7            | 20  |
| Total                                                | 90.4         | 100 | 706.2        | 100 | 233.2        | 100 | 362.8        | 100 | 1,392.6          | 100 |

Notes:

<sup>1</sup> Eggers and Reed 1997; 2014.

<sup>2</sup> Field data for coniferous bogs and coniferous swamps was combined.

<sup>3</sup> Coniferous tree species may be present within some hardwood swamps.

<sup>4</sup> Shallow marsh areas may contain deep marshes.

### **Wolf Lands 1**

The Wolf Lands 1 parcel consists of 122.8 acres, of which 90.4 acres are mapped as wetlands (approximately 72 percent) (see Figure 4.3.3-3 and Table 4.3.3-10). The most common wetland types within this parcel are coniferous swamps (approximately 84 percent) and shrub swamps (approximately 13 percent), which includes alder thickets and shrub-carr wetlands.

Most of the upland habitat consists of mature mixed forest, while most wetland habitats consist of coniferous forest. The parcel is relatively flat but slopes gently downward toward the southwest. The Wolf Lands 1 parcel is adjacent to Lake County North (AECOM 2011c). The eastern half of the parcel is wetland, while upland comprises most of the western portion of the parcel. Pine Lake is about 0.5 mile northwest of the parcel (AECOM 2011c).

Immature forested wetland communities on the parcel are comprised primarily of black spruce, with scattered northern white cedar and tamarack. More mature forested wetlands have characteristics of more open bogs, as tree cover is sparse at about 30 percent, while 80 percent of the area is covered by bog Labrador-tea and leatherleaf, and sphagnum moss covers most of the ground. In more immature forests, tree cover ranges from 60 to 80 percent, with a canopy dominated by 6 to 10 inches dbh black spruce, with tamarack and northern white cedar also present. The midstory consists of balsam fir and black spruce (about 40 percent cover), while speckled alder, leatherleaf, bog Labrador-tea, and red-osier dogwood dominate the shrub layer (40 percent cover) and club moss and sphagnum moss cover most of the ground (AECOM 2011c).

### **Wolf Lands 2**

The Wolf Lands 2 parcel consists of 767.9 acres, of which 706.2 acres are mapped as wetlands (approximately 92 percent) (see Figure 4.3.3-4 and Table 4.3.3-10). The most common wetland

types within Wolf Lands 2 are coniferous swamps (approximately 89 percent) and shrub swamps (approximately 10 percent), which includes both alder thickets and shrub-carr wetlands.

The Wolf Lands 2 parcel, which slopes toward the southwest, can generally be characterized by gently undulating terrain. Overland water flows to the southwest and to Mary Ann Creek, Wenko Creek, and Greenwood Lake. The Wolf Lands 2 parcel consists primarily of forested wetlands comprised of black spruce and northern white cedar, with a black ash component in a few drainages; shrubland comprised of speckled alder is also common on the parcel. Most upland habitat consists of mixed forest. Several drainages are dominated by speckled alder, while emergent wetland habitat is associated with beaver ponds. Black spruce is the dominant tree in wetlands in the northern and eastern portions of the parcel, while northern white cedar is more prevalent in other portions of the parcel (AECOM 2011c).

Forested wetlands are of three types: black spruce dominant, a mix of black spruce and northern white cedar, or northern white cedar dominant. Canopy trees range from four to eight inches dbh, with total canopy cover from 70 to 80 percent. The midstory consists of sapling black spruce, northern white cedar, and balsam fir. Midstory cover is patchy, ranging from 10 to 40 percent. Bog Labrador-tea comprises 10 to 30 percent of the low shrub cover, while sphagnum moss often covers more than 80 percent of the ground. In areas with a dense canopy, the midstory and ground cover are poorly developed (AECOM 2011c).

Several drainages are dominated by shrub swamp vegetation. These parcels generally have a sparse overstory, with approximately 20 percent aerial cover of black spruce, northern white cedar, and tamarack. Speckled alder and sapling trees usually cover 60 percent or more of the midstory, while low shrub cover consists of bog Labrador-tea (40 to 60 percent cover) (AECOM 2011c).

Beaver dams and ponds were found in the southeastern portion of the parcel during the field survey. Typically, open water is adjacent to the dams, with emergent wetland surrounding the open water and shrub wetlands upstream of the dams (AECOM 2011c).

### ***Wolf Lands 3***

The Wolf Lands 3 parcel consists of 277.4 acres, of which about 233.2 acres are mapped as wetlands (approximately 84 percent) (see Figure 4.3.3-4 and Table 4.3.3-10). The most common wetland types within the Wolf Lands 3 parcel are shrub swamps (approximately 63 percent), which includes alder thickets and shrub-carr wetlands, and second most common are coniferous swamps (approximately 35 percent).

The Wolf Lands 3 parcel is relatively flat. Coyote Creek begins its flow north within the parcel. Uplands consist of mostly shrubland and deciduous forest, while wetlands are dominated by shrub wetland and coniferous forested wetland habitats (AECOM 2011c). About half of the parcel had been recently logged. Logged wetlands are dominated by grasses, forbs, and low-growing shrubs, including red-osier dogwood and speckled alder. In the unlogged areas, forested wetlands are comprised primarily of black spruce. In the northern portion of the parcel, black spruce is co-dominant with tamarack; in the rest of the parcel, tamarack is present in the canopy but in much lower quantity (AECOM 2011c).

In shrub swamp wetlands, speckled alder covers from 20 to 80 percent of the area. In some areas, bog Labrador-tea covers 80 to 90 percent of the ground, especially in areas with a dense cover of speckled alder. In areas with a lower density of speckled alder, grasses, forbs, and ferns are the

dominant vegetation, but due to snow cover at the time of survey, it was not possible to determine percent ground cover or species composition. Scattered sapling black spruce and paper birch are also seen on logged wetlands. Woody debris from the recent logging operations is abundant in logged areas (AECOM 2011c).

In the unlogged areas, wetland forests are comprised of black spruce. In the northern part of the parcel, the black spruce is co-dominant with tamarack; in the rest of the parcel, tamarack is present in the canopy but in much lower amounts. Total canopy cover ranges from 60 to 80 percent, with canopy trees ranging from 4 to 10 inches dbh. The midstory consists of balsam fir and black spruce (20 to 30 percent cover), while the shrub layer is dominated by bog Labrador-tea (80 percent), over a ground layer of nearly continuous (80 percent cover or more) sphagnum moss with scattered grasses and forbs (AECOM 2011c).

Coyote Creek is bordered by an emergent sedge meadow wetland complex comprised of sedges, narrow-leaved cattail, and Canada bluejoint (collectively about 90 percent cover). There is also scattered sapling tamarack and northern white cedar, as well as scattered patches of speckled alder and bog Labrador-tea. The emergent wetland is bordered by dense (80 percent cover) speckled alder. Water depth in the emergent and shrub wetlands is approximately 18 to 24 inches (AECOM 2011c).

Logging roads on the parcel have become emergent wetland habitat dominated by narrow-leaved cattail, woolgrass, Canada bluejoint, scattered sedges, and speckled alder. Herbaceous vegetation covers about 70 to 80 percent of the wetland area, while alder shrubs cover approximately 10 percent of the wetlands (AECOM 2011c).

#### ***Wolf Lands 4***

The Wolf Lands 4 parcel consists of 404.7 acres of which 362.8 acres are mapped as wetlands (approximately 90 percent) (see Figure 4.3.3-4 and Table 4.3.3-10). The most common wetland types within the Wolf Lands 4 parcel are coniferous swamps (approximately 88 percent) and shrub swamps (approximately 12 percent).

Coyote Creek bisects the parcel, while the Stony River is about 2,000 ft northwest of the parcel. Timber harvests recently occurred along the western border of the parcel. Upland habitats consist primarily of mature deciduous forest, while forested and shrub wetland community types dominate wetland habitats (AECOM 2011c).

Wetland types include coniferous forest, shrub wetlands, and emergent. Black spruce forests are the most prevalent community type in the northern half of the parcel, while northern white cedar is more prevalent in the southern half of the parcel. Emergent wetland communities that include various species of sedge, Canada bluejoint grass, and shrub wetlands comprised primarily of speckled alder are found in floodplains that border Coyote Creek. Shrub wetlands also occur in two drainages to Coyote Creek in the southeastern portion of the parcel and in a drainage to the Stony River in the northeastern portion of the parcel (AECOM 2011c).

Coniferous wetlands composed of black spruce and black spruce/northern white cedar are dominated by trees ranging from four to eight inches dbh, with a patchy canopy cover of about 50 percent. Scattered tamaracks are also found in these wetlands. The low shrub layer is nearly continuous (80 to 90 percent cover), and is comprised of leatherleaf, bog Labrador-tea, and other vegetation. Sphagnum and club mosses cover most of the ground. Other forests have a more developed midstory, with 60 percent cover by black spruce, northern white cedar, tamarack, and

speckled alder, and a similarly dense shrub layer, with 60 to 70 percent cover by leatherleaf and bog Labrador-tea (AECOM 2011c).

Shrub wetlands are dominated by speckled alder (60 to 80 percent cover), with scattered black spruce, tamarack, and northern white cedar in the overstory. Leatherleaf and bog Labrador-tea cover about 40 to 50 percent of the shrub layer (AECOM 2011c).

### **Wetland Functional Assessment**

Table 4.3.3-11 summarizes the 18 wetland functional value ratings (three for Wolf Lands 1, six for Wolf Lands 2, six for Wolf Lands 3, and three for Wolf Lands 4) that were obtained for Tract 3 for the primary wetland functions rated by MnRAM 3.2. Tract 3 wetlands were rated high for nearly all wetland functional values with the exception of flood attenuation on Wolf Lands 2, 3, and 4; amphibian habitat on Wolf Lands 3; and aesthetic, recreational, educational, and cultural values for all four sub-parcels.

**Table 4.3.3-11 Wetland Functional Value Assessment for Tract 3**

| Wetland Functions and Value Rating | Functional Value Ratings (%)       |           |                   |                          |                       |                  |              |                   |                                       |
|------------------------------------|------------------------------------|-----------|-------------------|--------------------------|-----------------------|------------------|--------------|-------------------|---------------------------------------|
|                                    | Vegetation Diversity/<br>Integrity | Hydrology | Flood Attenuation | Downstream Water Quality | Wetland Water Quality | Wildlife Habitat | Fish Habitat | Amphibian Habitat | Aesthetics/<br>Education/<br>Cultural |
| <b>Wolf Lands 1</b>                |                                    |           |                   |                          |                       |                  |              |                   |                                       |
| High                               | 100                                | 100       | 100               | 100                      | 100                   | 100              | 67           | 67                | 0                                     |
| Moderate                           | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 0                 | 100                                   |
| Low                                | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 0                 | 0                                     |
| Not Available or Applicable        | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 33           | 33                | 0                                     |
| Total                              | 100                                | 100       | 100               | 100                      | 100                   | 100              | 100          | 100               | 100                                   |
| <b>Wolf Lands 2</b>                |                                    |           |                   |                          |                       |                  |              |                   |                                       |
| High                               | 100                                | 100       | 20                | 100                      | 100                   | 100              | 33           | 33                | 0                                     |
| Moderate                           | 0                                  | 0         | 80                | 0                        | 0                     | 0                | 0            | 0                 | 100                                   |
| Low                                | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 0                 | 0                                     |
| Not Available or Applicable        | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 67           | 67                | 0                                     |
| Total                              | 100                                | 100       | 100               | 100                      | 100                   | 100              | 100          | 100               | 100                                   |
| <b>Wolf Lands 3</b>                |                                    |           |                   |                          |                       |                  |              |                   |                                       |
| High                               | 100                                | 100       | 0                 | 100                      | 100                   | 100              | 50           | 33                | 0                                     |
| Moderate                           | 0                                  | 0         | 100               | 0                        | 0                     | 0                | 0            | 33                | 100                                   |
| Low                                | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 17                | 0                                     |
| Not Available or Applicable        | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 50           | 17                | 0                                     |
| Total                              | 100                                | 100       | 100               | 100                      | 100                   | 100              | 100          | 100               | 100                                   |
| <b>Wolf Lands 4</b>                |                                    |           |                   |                          |                       |                  |              |                   |                                       |
| High                               | 100                                | 100       | 0                 | 100                      | 100                   | 100              | 33           | 100               | 0                                     |
| Moderate                           | 0                                  | 0         | 100               | 0                        | 0                     | 0                | 0            | 0                 | 100                                   |
| Low                                | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 0            | 0                 | 0                                     |
| Not Available or Applicable        | 0                                  | 0         | 0                 | 0                        | 0                     | 0                | 67           | 0                 | 0                                     |
| Total                              | 100                                | 100       | 100               | 100                      | 100                   | 100              | 100          | 100               | 100                                   |

Source: AECOM 2011c.

### **Floodplains**

As previously indicated, there are no mapped floodplains in Lake County; therefore, there are no mapped floodplains on the Wolf Lands tracts. However, the extent of unmapped floodplains along Coyote Creek for Tract 3 was estimated to be 112.2 acres, based upon topography (see Figure 4.3.3-5). Wolf Lands 3 was estimated to have 32.8 acres of floodplains and Wolf Lands 4 was estimated to have 79.4 acres. The ratio of the number of acres of floodplain per acre of parcel is 0.1 and 0.2, respectively (AECOM 2011d).

### **Frontage of Waterways**

Coyote Creek begins in Wolf Lands 3, flows north into Wolf Lands 4, and continues north of Wolf Lands 4. The creek is 0.1 mile in length in Wolf Lands 3, and 0.9 miles in length in Wolf Lands 4. Riparian habitat is found on both sides of the river. The linear distance of river frontage for Wolf Lands 3 and Wolf Lands 4 is 1,056.0 and 9,504 linear ft, respectively. The length of river frontage per acre on Wolf Lands 3 and Wolf Lands 4 was calculated to be 3.8 and 23.5 ft, respectively.

#### **4.3.3.2.5 Tract 4 – Hunting Club Lands**

##### **Hydrology, Wetland Vegetation, and Community Types**

Tract 4 consists of 160.2 acres, of which 63.6 acres are mapped as wetland (approximately 40 percent) (see Figure 4.3.3-4 and Table 4.3.3-12). The most common wetland types within Tract 4 are shrub swamps (approximately 50 percent), which includes alder thickets and shrub-carr wetlands; coniferous swamps (approximately 24 percent); and shallow marshes (approximately 20 percent). The parcel is nearly level and consists predominantly of second- and third-growth deciduous and mixed deciduous and coniferous forested uplands and emergent, shrub, and forested wetlands (AECOM 2011c).

**Table 4.3.3-12 Total Wetland Acreage by Wetland Type for Tract 4**

| Eggers and Reed Class <sup>1</sup>                   | Total Hunting Club |     |
|------------------------------------------------------|--------------------|-----|
|                                                      | Acres              | %   |
| Coniferous swamp <sup>2</sup>                        | 15.4               | 24  |
| Hardwood swamp <sup>3</sup>                          | 0.4                | 1   |
| Open bog                                             | 0.0                | 0   |
| Open water (includes shallow, open water, and lakes) | 2.8                | 5   |
| Shallow marsh <sup>4</sup>                           | 13.0               | 20  |
| Shrub swamp (includes alder thicket and shrub-carr)  | 32.0               | 50  |
| Total                                                | 63.6               | 100 |

Notes:

<sup>1</sup> Eggers and Reed 1997; 2014.

<sup>2</sup> Field data for coniferous bogs and coniferous swamps was combined.

<sup>3</sup> Coniferous tree species may be present within some hardwood swamps.

<sup>4</sup> Shallow marsh areas may contain deep marshes.

A wetland complex bisects the parcel and drains to the north and then northeast. From this low area, the land slopes upward to the east and west. Several beaver dams were found during field surveys along the creek on or near the parcel. The parcel consists primarily of wetland

shrublands, with lesser amounts of emergent and shrub wetlands and upland deciduous forests (AECOM 2011c).

Beaver ponds and dams are the dominant wetland features on the parcel. Open water habitat is typical near the dams. Emergent vegetation, consisting of Canada bluejoint grass, narrow-leaved cattail, and various sedge species, are found in water from 12 to 24 inches deep, while speckled alder shrub wetlands are located near ponds at water depths from 6 to 18 inches. A large black spruce forest is located in the middle of the parcel. Overstory cover is about 60 percent, with most of the cover resulting from black spruce, with scattered tamarack occasionally present. The midstory consists of speckled alder (50 percent cover), while leatherleaf and bog Labrador-tea (80 percent cover) and sphagnum moss (about 80 percent cover) are found below the speckled alder (AECOM 2011c).

### **Wetland Functional Assessment**

Table 4.3.3-13 summarizes the three wetland functional value ratings that were obtained for Tract 4 for the primary wetland functions rated by MnRAM 3.2. Tract 4 wetlands were rated high for nearly all wetland functional values with the exception of flood attenuation, amphibian habitat, and aesthetic, recreational, educational, and cultural values.

***Table 4.3.3-13 Wetland Functional Value Assessment for Tract 4***

| Wetland Functions and Value Rating | Functional Value Ratings (%)    |           |                   |                          |                       |                  |              |                   |                                 |  |
|------------------------------------|---------------------------------|-----------|-------------------|--------------------------|-----------------------|------------------|--------------|-------------------|---------------------------------|--|
|                                    | Vegetation Diversity/ Integrity | Hydrology | Flood Attenuation | Downstream Water Quality | Wetland Water Quality | Wildlife Habitat | Fish Habitat | Amphibian Habitat | Aesthetics/ Education/ Cultural |  |
| High                               | 100                             | 100       | 0                 | 100                      | 100                   | 100              | 100          | 33                | 0                               |  |
| Moderate                           | 0                               | 0         | 100               | 0                        | 0                     | 0                | 0            | 33                | 100                             |  |
| Low                                | 0                               | 0         | 0                 | 0                        | 0                     | 0                | 0            | 0                 | 0                               |  |
| Not Available or Applicable        | 0                               | 0         | 0                 | 0                        | 0                     | 0                | 0            | 33                | 0                               |  |
| Total                              | 100                             | 100       | 100               | 100                      | 100                   | 100              | 100          | 99                | 100                             |  |

Source: AECOM 2011c.

### **Floodplains**

Tract 4 is located within St. Louis County, where there are no mapped floodplains identified on the county's FIRM. There were no unmapped floodplains associated with Tract 4.

### **Frontage of Waterways**

Tract 4 does not include any streams, rivers, creeks, or lakes.

#### **4.3.3.2.6 Tract 5 – McFarland Lake Lands**

##### **Hydrology, Wetland Vegetation, and Community Types**

Tract 5 is a single parcel of 30.8 acres. The entire parcel is mapped as upland. The parcel is approximately 3 miles west of the U.S.-Canada border. This parcel is mostly on a hill slope and

consists of second- and third-growth deciduous and coniferous forested uplands. There are no wetlands located on Tract 5. This parcel is surrounded by the Superior National Forest. McFarland Lake borders Tract 5 and provides lake habitat (AECOM 2011b).

### **Wetland Functional Assessment**

No wetlands are associated with Tract 5; therefore, there are no functional assessment values.

### **Floodplains**

Cook County has an older Flood Hazard Boundary Map developed by the HUD to estimate the areas of frequent inundation. FEMA rescinded the map in 1985 and it is not considered to be an effective FEMA FIRM map; therefore, it is not used as part of the management of flood-prone areas. Cook County does not have a floodplain overlay ordinance; therefore, there are no “regulatory floodplains” within Cook County. While the floodplains identified using the older map are not considered to be the effective FEMA FIRM maps of flood-prone areas, they can offer an approximation of floodplains within the county for the effects analysis.

Mapped floodplain identification for the effects analysis of non-federal lands in Cook County was done using this older, rescinded map and it was determined that Tract 5 has no mapped or unmapped floodplains.

### **Frontage of Waterways**

Tract 5 borders McFarland Lake. The parcel has a lake frontage of approximately 990 ft along McFarland Lake. The length of lake frontage per acre on Tract 5 was calculated to be 32.1 ft.

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#### **4.3.4 Vegetation**

Rulemaking was conducted with the intent to update the list of ETSC species (*Minnesota Rules*, parts 6134.0100 to 6134.0400), with new listings becoming effective on August 19, 2013 (MDNR 2013h). This FEIS considers any new listings, or changes in the previous listings, associated with the updated list. A BE has been prepared that contains further information about RFSS. The BE is included in Appendix D.

##### **4.3.4.1 Federal Lands**

The federal lands include a large tract of mostly forested land, up to 6,495.4 acres in size. The tract is located in the west-central part of the Superior National Forest (PolyMet 2015a).

###### **4.3.4.1.1 Land Exchange Proposed Action**

###### **Cover Types**

Cover types consist of several categories of classification, including MDNR GAP land cover types, specific plant community survey results, MBS Sites of Biodiversity Significance, SNAs, USFS Management Areas, USFS ELTs, USFS MIH types, and USFS landscape ecosystems.

###### ***Habitat Types***

The federal land cover types are similar to the Mine Site described in Section 4.2.4.2.1 (see Figure 4.2.4-1). Specific acreages for MDNR GAP land cover types on the federal lands are presented in Table 4.3.4-1 below. In the past, portions of the federal lands have been logged to varying degrees, depending on the management area allocation. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-1 Federal Lands Cover Types**

| Cover Types                                        | Total Acres    | Percent of Area |
|----------------------------------------------------|----------------|-----------------|
| Lowland coniferous forest <sup>1</sup>             | 2,978.6        | 46              |
| Upland coniferous forest <sup>2</sup>              | 1,618.9        | 25              |
| Upland deciduous forest <sup>3</sup>               | 1,091.8        | 17              |
| Shrubland                                          | 645.6          | 10              |
| Disturbed                                          | 63.8           | 1               |
| Aquatic environments                               | 60.1           | 1               |
| Upland conifer-deciduous mixed forest <sup>4</sup> | 20.9           | <1              |
| Lowland deciduous forest <sup>5</sup>              | 9.5            | <1              |
| Cropland/grassland                                 | 6.2            | <1              |
| <b>Total</b>                                       | <b>6,495.4</b> | <b>100</b>      |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes pine and spruce/fir forest cover types.

<sup>3</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>4</sup> Includes all mixed coniferous-deciduous forest cover types.

<sup>5</sup> Includes black ash forest cover types.

### **Plant Community Surveys**

Wetlands are dominated by immature black spruce and northern white cedar, with scattered tamarack (*Larix laricina*) and aspen (AECOM 2011d). There are several areas of open water, including Mud Lake, the Partridge River, Yelp Creek, and scattered small ponds. Bogs are dominated by leatherleaf (*Chamaedaphne calyculata*) and bog-Labrador tea (*Ledum groenlandicum*). Uplands are dominated by immature mixed pine-hardwood forests, including jack pine, black spruce, trembling aspen (*Populus tremuloides*), paper/white birch (*Betula papyrifera*), and balsam fir. Grassland/shrubland habitat is uncommon and is primarily associated with the transmission line ROW in the western portion and recent logging in the southeastern portion of the federal lands. Disturbed areas are associated with roads and landings, waste rock storage areas immediately north of the federal lands, and a rail route along the southern portion of the federal lands.

The majority of forest stand trees on the federal lands are characterized as immature, or 12 inches dbh or less, which corresponds to trees from 10 to 60 years in age (AECOM 2011d). For both coniferous and deciduous trees, the largest ones are approximately 18 to 20 inches dbh, but a 24-inch dbh red pine was found on the federal lands. Much of the One Hundred Mile Swamp north and west of the Mine Site consists of mature (80-plus years in age) black spruce and northern white cedar.

Of the wetlands that are located on the federal lands, the majority are determined to have high overall quality due to minimal or no current disturbance (AECOM 2011a). Of the wetlands that are located on the Mine Site, the majority (92 percent) is rated as having a high overall wetland quality and 8 percent are of moderate overall wetland quality. Wetlands on the federal lands are rated high for nearly all wetland functions, based on the MnRAM 3.2 criteria (AECOM 2011d). Vegetation diversity and integrity are rated moderate to high for all wetlands because recent human contact and alteration are minimal and the wetlands have a relatively constant supply of water. See Section 4.3.3 for a more detailed discussion on wetlands.

### ***Minnesota Biological Survey***

The majority (6,142.7 acres) of the federal lands consist of MBS Sites of High Biodiversity Significance, including the One Hundred Mile Swamp site (53 percent of federal lands) and the Upper Partridge River site (41 percent of federal lands). The Upper Dunka Peatlands site (less than 1 percent of federal lands) is a Site of Moderate Biodiversity Significance and is also located on the federal lands (see Figure 4.2.4-1) (MDNR 2008a). These sites are located in the Laurentian Uplands subsection.

Three vegetation communities, white pine-red pine forest (FDn43a; less than 1 percent of federal lands), black spruce-Jack pine woodlands (FDn32c; 17 percent of federal lands), and rich black spruce swamps (FPn62a; 5 percent of federal lands) have been characterized by the MBS as “imperiled,” “imperiled/vulnerable,” and “vulnerable” native plant communities, respectively (MDNR 2008b). Black ash-conifer swamps (WFn64a), black spruce bogs (APn80a), graminoid bogs (APn90b1), poor tamarack-black spruce swamps (APn81b), and white cedar swamps (FPn63a) are ranked as “apparently secure” in Minnesota based on abundance, distribution, trends, and threats. Aspen-birch forests: balsam fir subtype (FDn43b1), alder swamps (FPn73a), poor black spruce swamps (APn81a), rich tamarack-alder swamps (FPn82a), willow-dogwood shrub swamps (WMn82a), and low shrub poor fens (APn91a) are all considered “widespread and secure.”

### ***Scientific and Natural Areas***

Similar to the Mine Site, there are no lands designated or nominated for designation as SNAs on the federal lands (MDNR 2006c; MDNR, Pers. Comm., February 14, 2012).

### ***Culturally Important Plants***

Natural resources culturally important to the Bands are discussed in Section 4.2.9.3.3.

### ***Management Areas***

The USFS manages its forests by assigning various management area allocations. The federal lands are currently managed under the General Forest – Longer Rotation Management Area (95 percent) and the General Forest Management Area (5 percent) (see Table 4.3.4-2) (USFS 2011j). Section 4.3.1 describes the management areas in detail.

***Table 4.3.4-2 Management Areas for the Federal Lands***

| Category                                   | Federal Lands |         |
|--------------------------------------------|---------------|---------|
|                                            | Acres         | Percent |
| General Forest                             | 355.3         | 5       |
| General Forest – Longer Rotation           | 6,140.1       | 95      |
| Potential/Candidate Research Natural Areas | 0.0           | 0       |
| Riparian Areas                             | 0.0           | 0       |

Source: USFS 2011j.

### ***Ecological Land Types***

USFS ELT data for the federal lands are not fully developed, but provide data for over half of the parcel. The federal lands contain five different categories of ELTs, including Lowland Loamy

Moist (ELT 1), Lowland Loamy Wet (ELT 2), Lowland Organic Acid to Neutral (ELT 6), Upland Deep Loamy Dry Coarse (ELT 13), and Upland Shallow Loamy Dry (ELT 16). Almost all of the federal lands are included within the Big-Bird Lake Moraine LTA, with the small remaining portion included in the Mesabi Range LTA.

### **Management Indicator Habitats**

As mentioned previously, the USFS also tracks MIH types. The most abundant MIH type on the federal lands is lowland black spruce-tamarack forest (MIH 9; 3,060.2 acres), but upland forest (MIH 1; 1,330.0 acres) and upland conifer forest (MIH 5; 1,252.4 acres) is also present (see Table 4.3.4-3) (USFS 2010b). Aquatic habitats (MIH 14) are not tracked on the federal lands, though several open water features occur on the federal lands (see Figure 4.2.4-4). Though not considered MIH types, the federal lands contain 492.3 acres of lowland shrub habitat and 185.5 acres of lowland emergent wetlands, as well. The remaining acres present on the federal lands have no corresponding MIH classification.

The USFS Forest Stand data also contain information about forest stand ages. The majority of the federal lands consist of mature (3,854.2 acres) forest stands, with smaller amounts of immature (1,539.2 acres) stands and young (271.1 acres) stands (USFS 2011i). Additionally, the USFS tracks large (greater than 300 acres) contiguous patches of mature upland forest (MIH 13) on the Superior National Forest. There are currently no patches of mature upland forest over 300 acres on the federal lands (USFS 2012c). However, since smaller patches will grow over time into larger contiguous patches, the USFS predicts that in 2020, there would be two patches (707.8 acres and 322.1 acres) over 300 acres on the federal lands (USFS 2012d).

**Table 4.3.4-3 MIH Types and Age Classes (Acres) for the Federal and Non-federal Lands**

| MIH Type         | Total                               |                                         | Tract 1  |                   | Tract 2           |                | Tract 3        |                | Tract 4        |                | Tract 5      |                |
|------------------|-------------------------------------|-----------------------------------------|----------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|--------------|----------------|
|                  | Total of Federal Lands <sup>1</sup> | Total of Non-federal Lands <sup>2</sup> | Hay Lake | Lake County North | Lake County South | Tract 2 - Lake | Tract 2 - Wolf | Tract 3 - Wolf | Tract 3 - Wolf | Tract 3 - Wolf | Hunting Club | McFarland Lake |
| MIH 1            | 1,330.0                             | 2,694.5                                 | 2,366.0  | 49.1              | 2.1               | 43.8           | 56.8           | 40.9           | 20.4           | 89.3           |              | 26.1           |
| MIH 5            | 1,252.4                             | 79.9                                    | 54.2     | 1.1               | 0.0               | 0.0            | 7.9            | 0.0            | 0.0            | 12.7           |              | 4.0            |
| MIH 9            | 3,060.2                             | 3,308.5                                 | 1,817.6  | 193.7             | 46.2              | 72.2           | 626.6          | 186.2          | 348.9          | 17.1           |              | 0.0            |
| MIH 14           | 0.0                                 | 226.7                                   | 206.2    | 0.5               | 3.3               | 0.0            | 0.5            | 0.9            | 4.3            | 10.3           |              | 0.7            |
| Lowland Shrub    | 492.3                               | 332.2                                   | 113.3    | 20.6              | 6.4               | 9.7            | 76.0           | 48.6           | 31.0           | 26.6           |              | 0.0            |
| Lowland Emergent | 185.5                               | 385.7                                   | 365.0    | 0.0               | 15.6              | 0.0            | 0.0            | 0.9            | 0.0            | 4.2            |              | 0.0            |
| Upland Grass     | 0.0                                 | 43.3                                    | 0.0      | 0.0               | 43.3              | 0.0            | 0.0            | 0.0            | 0.0            | 0.0            |              | 0.0            |
| <b>Age Class</b> |                                     |                                         |          |                   |                   |                |                |                |                |                |              |                |
| Young            | 271.1                               | 778.2                                   | 533.8    | 24.4              | 43.3              | 2.2            | 7.6            | 130.4          | 9.5            | 27.0           |              | 0.0            |
| Immature         | 1,539.2                             | 3,539.7                                 | 3,259.8  | 74.6              | 0.8               | 76.1           | 68.7           | 21.8           | 5.4            | 32.5           |              | 0.0            |
| Mature           | 3,854.2                             | 1,824.6                                 | 460.2    | 144.9             | 47.6              | 37.8           | 615.1          | 74.9           | 354.3          | 59.7           |              | 30.1           |

Sources: USFS 2010b; USFS 2011i.

Note:

<sup>1</sup> Determined based on: AECOM 2011c; AECOM 2011b; USFS 2010b; USFS 2011i.

### ***Landscape Ecosystems***

In order for the USFS to sustainably and ecologically manage National Forest System lands, it must consider areas based on historical and current ecosystem functions. The USFS tracks and manages the Superior National Forest and other National Forest System lands on several levels, but to maintain a broader ecosystem view it uses a landscape ecosystem basis. A landscape ecosystem is an area that shares similar habitat composition, structure, and functions and occurs naturally on the landscape (USFS 2004a). The federal lands are located within three landscape ecosystem types, including Jack Pine-Black Spruce, Lowland Conifer, and Mesic Red and White Pine (see Table 4.3.4-4).

The Jack Pine-Black Spruce landscape ecosystem occupies 3,000.1 acres of the federal lands (represents less than 0.01 percent of Jack Pine-Black Spruce landscape ecosystem). It is dominated by both jack pine and black spruce, but aspen and paper birch are also occasionally present (USFS 2004a). Typically, jack pine dominates areas after fire disturbances and black spruce dominates areas after wind disturbances.

The Lowland Conifer landscape ecosystem occupies 3,460.3 acres of the federal lands (represents 0.01 percent of Lowland Conifer landscape ecosystem). It is dominated by one or all three species of black spruce, tamarack, and northern white cedar (USFS 2004a). Typically, black spruce occupies acidic organic soils, northern white cedar occupies neutral sites, and tamarack occupies areas between both types. Fire disturbances are more frequent than wind disturbances.

The Mesic Red and White Pine landscape ecosystem occupies less than one acre of the federal lands (represents less than 0.01 percent of Mesic Red and White Pine landscape ecosystem). It is dominated by mixed stands of red pine, white pine, aspen, paper birch, northern white cedar, white spruce, and balsam fir (USFS 2004a). Severe fire disturbances typically result in aspen/birch stands with red and white pine also present. Succession generally reduces the aspen/birch component, which leaves pines as the dominant species. White spruce and balsam fir typically regenerate in the understory.

**Table 4.3.4-4 Landscape Ecosystem Types (Acres) on Federal and Non-federal Lands<sup>1,2</sup>**

| Landscape Ecosystem Type     | Total of Federal Lands | Total of Non-Federal Lands | Tract 1 – Hay Lake | Tract 2 – Lake County North | Tract 2 – Lake County South | Tract 3 – Wolf 1 | Tract 3 – Wolf 2 | Tract 3 – Wolf 3 | Tract 3 – Wolf 4 | Tract 4 – Hunting Club | Tract 5 – McFarland Lake |
|------------------------------|------------------------|----------------------------|--------------------|-----------------------------|-----------------------------|------------------|------------------|------------------|------------------|------------------------|--------------------------|
| Dry-Mesic Red and White Pine | 0.0                    | 682.9                      | 589.2              | 0.0                         | 0.0                         | 0.0              | 0.0              | 0.0              | 0.0              | 93.7                   | 0.0                      |
| Mesic Red and White Pine     | 0.1                    | 558.8                      | 528.0              | 0.0                         | 0.0                         | 0.0              | 0.0              | 0.0              | 0.0              | 0.0                    | 30.8                     |
| Jack Pine-Black Spruce       | 3,000.1                | 983.5                      | 983.5              | 0.0                         | 0.0                         | 0.0              | 0.0              | 0.0              | 0.0              | 0.0                    | 0.0                      |
| Lowland Conifer              | 3,460.3                | 4,455.0                    | 2,835.3            | 227.6                       | 80.2                        | 84.3             | 653.2            | 217.7            | 356.7            | 0.0                    | 0.0                      |
| Mesic Birch-Aspen-Spruce-Fir | 0.0                    | 302.1                      | 0.9                | 37.4                        | 0.0                         | 41.5             | 114.7            | 59.7             | 47.9             | 0.0                    | 0.0                      |
| Lowland Hardwood             | 0.0                    | 66.5                       | 0.0                | 0.0                         | 0.0                         | 0.0              | 0.0              | 0.0              | 0.0              | 66.5                   | 0.0                      |
| Sugar Maple                  | 0.0                    | 36.7                       | 0.0                | 0.0                         | 36.7                        | 0.0              | 0.0              | 0.0              | 0.0              | 0.0                    | 0.0                      |

Source: USFS 2011g.

Notes:

<sup>1</sup> Total acres may be more or less than presented elsewhere due to rounding or GIS layers used.

<sup>2</sup> Data may not have complete coverage of parcels.

### **Invasive Non-native Plants**

The federal lands have the same invasive non-native species as the Mine Site since they occupy the same area. Section 4.2.4.2.2 provides a list of invasive non-native species likely located on the federal lands.

### **Threatened and Endangered Plant Species**

#### ***Endangered, Threatened, and Special Concern Plant Species***

No federally listed threatened and endangered plant species are known to occur on the federal lands. The federal lands contain the same state-listed ETSC plant species as the Mine Site, with the exception of *Botrychium campestre*, which is located south of the federal lands on the Mine Site; an additional species, *Pyrola minor*, is found north of the Mine Site on the federal lands. Section 4.2.4.2.3 provides a list and discussion of the ETSC species on the federal lands.

Ten state-listed ETSC plant species are known to occur on the federal lands. Based on a review of the MDNR NHIS and field investigations (AECOM 2009b; Barr 2007i; Johnson-Groh 2004; Pomroy and Barnes 2004; Walton 2004), one state endangered species, and nine state species of special concern have been identified on the federal lands (see Table 4.3.4-5 and Figure 4.2.4-3). Some colonies of species listed for the Mine Site may be located outside of the federal lands but within the Mine Site. As a result, numbers of individuals may be smaller than the Mine Site.

Rulemaking was conducted with the intent to update the list of ETSC species (*Minnesota Rules*, parts 6134.0100 to 6134.0400), with new listings becoming effective on August 19, 2013 (MDNR 2013h). This FEIS considers any new listings, or changes in the previous listings, associated with the updated list.

**Table 4.3.4-5 Endangered, Threatened, and Special Concern Plant Species Identified on the Federal Lands<sup>5</sup>**

| Common Name                                      | Scientific Name                               | State Status <sup>1</sup> | No. of Populations <sup>2</sup> | No. of Individuals <sup>2,3</sup> | Habitat and Location                                                                                                  |
|--------------------------------------------------|-----------------------------------------------|---------------------------|---------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Pale moonwort <sup>4</sup>                       | <i>Botrychium pallidum</i>                    | SC                        | 1                               | 2                                 | Full to shady exposure, edge of alder thicket, along Dunka Road.                                                      |
| Ternate, or St. Lawrence, grapefern <sup>4</sup> | <i>Botrychium rugulosum (ternatum)</i>        | SC                        | 1                               | 4                                 | Early successional habitats, fields, open woods, forests, and along Dunka Road.                                       |
| Least grapefern <sup>4</sup>                     | <i>Botrychium simplex</i>                     | SC                        | 3                               | 905                               | Full to shady exposure, edge of alder thicket, forest roads, along Dunka Road.                                        |
| Floating marsh marigold <sup>4</sup>             | <i>Caltha natans</i>                          | E                         | 1                               | 29                                | Shallow water in ditches and streams, alder swamps, shallow marshes, beaver ponds, and Partridge River mudflat.       |
| Neat spikerush <sup>4</sup>                      | <i>Eleocharis nitida</i>                      | SC                        | 1                               | ~486 ft <sup>2</sup>              | Full exposure, moist ditches along Dunka Road, wet area between railroad grades, and railroad ditch.                  |
| Bog rush <sup>4</sup>                            | <i>Juncus stygicus</i> var. <i>americanus</i> | SC                        | 1                               | Unknown                           | Open-patterned peatlands, rich and poor fens, northern spruce bog within the One Hundred Mile swamp.                  |
| Club-spur orchid                                 | <i>Platanthera clavellata</i>                 | SC                        | 1                               | Unknown                           | Black spruce and/or tamarack swamps, northern spruce bog within the One Hundred Mile swamp.                           |
| Small shinleaf <sup>4</sup>                      | <i>Pyrola minor</i>                           | SC                        | 1                               | 10                                | Rich black spruce swamps, cedar swamps, on Sphagnum hummocks in forested peatlands within the One Hundred Mile swamp. |
| Lapland buttercup                                | <i>Ranunculus lapponicus</i>                  | SC                        | 1                               | ~919 ft <sup>2</sup>              | On and adjacent to Sphagnum hummocks in black spruce stands, up to 60 percent shaded with alder also dominant.        |
| Torrey's manna-grass                             | <i>Torreyochloa pallida</i>                   | SC                        | 1                               | ~25 ft <sup>2</sup>               | In muddy soil along shore and in water within shallow channels, beaver ponds, shallow marshes, along Partridge River. |

Sources: AECOM 2009b; Barr 2007i; Johnson-Groh 2004; MDNR 2005; MDNR 2011k; MDNR 2014d; Pomroy and Barnes 2004; Walton 2004.

Notes:

- <sup>1</sup> E - Endangered, T - Threatened, SC - Species of Special Concern.
- <sup>2</sup> Note that the number of populations may differ from those given in the NHIS data because of populations found during other surveys.
- <sup>3</sup> Where the number of individuals could not be determined without damaging the population, then patch size was used as a representative abundance measure.
- <sup>4</sup> These species are also RFSS as tracked by the USFS.
- <sup>5</sup> Data included here were provided by the Division of Ecological Resources, MDNR, and were current as of August 5, 2014. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.

### **Species Life Histories**

The species life histories are provided in Section 4.2.4.2.3 for all species except the additional one listed below.

Small shinleaf (*Pyrola minor*) is listed as a species of special concern in Minnesota and as an RFSS in the Superior National Forest. The species was first reported in Lake County in 1914 near the North Kawishiwi River. It has since only been documented in Cook, St. Louis, Lake (Bell Museum of Natural History 2011), and Carlton counties (NatureServe 2014b). *P. minor* is a circumpolar species occurring across Canada and the western United States in boreal and alpine habitats (MDNR 2011k). It usually occurs in conifer swamps, including black spruce and northern white cedar swamps, and black spruce-balsam fir woodlands. Small shinleaf can also be found along moist ecotones between wetlands and uplands or between streams and slopes. It is a perennial evergreen forb species that is rhizomatous and flowers in mid-July. It may be semi-tolerant to disturbance, since healthy populations exist along well-traveled portage routes and at sites that have experienced timber harvesting around 20 years prior (MDNR 2011k). Threats to *P. minor* include climate change, since it is a circumpolar species, and competition from non-native species.

### **Regional Foresters Sensitive Species**

Seven state-listed ETSC plant species that occur on the federal lands (*Botrychium pallidum*, *Botrychium rugulosum*, *Botrychium simplex*, *Caltha natans*, *Eleocharis nitida*, *Juncus stygius*, and *Pyrola minor*) are also RFSS plants. A species description for *Pyrola minor* is provided above, and for the other six ETSC species in Section 4.2.4.2.3. The other RFSS plants that are likely located on the federal lands using MIH types and suitable habitat as indicators are discussed in Section 4.2.4.2.3.

#### **4.3.4.1.2 Land Exchange Alternative B**

##### **Cover Types**

A smaller portion of the federal lands (up to 4,752.6 acres) would be exchanged into private ownership under this alternative.

##### **Habitat Types**

The Alternative B: Smaller Federal Parcel contains similar MDNR GAP land cover types as the federal lands, but smaller acreages of them, with lowland coniferous forest making up the majority of the parcel and cropland/grassland occupying the least amount (see Table 4.3.4-6). The MDNR GAP land cover types below may not fully represent the extent of mixed forest

types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-6 Alternative B: Smaller Federal Parcel Cover Types**

| Cover Types                                        | Total Acres    | Percent of Area |
|----------------------------------------------------|----------------|-----------------|
| Lowland coniferous forest <sup>1</sup>             | 2,064.8        | 43              |
| Upland coniferous forest <sup>3</sup>              | 1,366.1        | 29              |
| Upland deciduous forest <sup>4</sup>               | 804.7          | 17              |
| Shrubland                                          | 436.9          | 9               |
| Disturbed                                          | 29.1           | 1               |
| Aquatic environments                               | 26.3           | 1               |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 17.8           | <1              |
| Lowland deciduous forest <sup>2</sup>              | 4.7            | <1              |
| Cropland/grassland                                 | 2.2            | <1              |
| <b>Total</b>                                       | <b>4,752.6</b> | <b>100</b>      |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

### **Minnesota Biological Survey**

Lands as part of the Alternative B: Smaller Federal Parcel would be mostly classified as MBS Sites of High Biodiversity Significance, including the Upper Partridge River (56 percent of Alternative B: Smaller Federal Parcel lands) and the One Hundred Mile Swamp (40 percent of Alternative B: Smaller Federal Parcel lands) (see Figure 4.2.4-1) (MDNR 2008a). Less than 1 percent of Alternative B: Smaller Federal Parcel would contain the Upper Dunka Peatlands MBS Site of Moderate Biodiversity Significance. These sites are located in the Laurentian Uplands subsection.

The Alternative B: Smaller Federal Parcel would also contain “imperiled,” “imperiled/vulnerable,” and “vulnerable” native plant communities, including white pine-red pine forests (FDn43a; less than 1 percent), rich black spruce swamp (FPn62a; 6 percent), and black spruce-Jack pine woodlands (FDn32c; 23 percent), respectively (MDNR 2008b). Black ash-conifer swamps (WFn64a), black spruce bogs (APn80a), graminoid bogs (APn90b1), poor tamarack-black spruce swamps (APn81b), and white cedar swamps (FPn63a) are ranked as “apparently secure” and are located in the Alternative B: Smaller Federal Parcel lands. Aspen-birch forests: balsam fir subtype (FDn43b1), alder swamps (FPn73a), poor black spruce swamps (APn81a), rich tamarack-alder swamps (FPn82a), willow-dogwood shrub swamps (WMn82a), and low shrub poor fens (APn91a) are all considered “widespread and secure” and are also on the Alternative B: Smaller Federal Parcel.

### **Scientific and Natural Areas**

There are no SNAs located on or near the Alternative B: Smaller Federal Parcel lands.

### ***Culturally Important Plants***

Similar to the federal lands, natural resources culturally important to the Bands are discussed in Section 4.2.9.3.3.

### ***Management Areas***

The Alternative B: Smaller Federal Parcel lands are currently managed under the General Forest – Longer Rotation Management Area (93 percent) and the General Forest Management Area (7 percent; see Table 4.3.4-7) (USFS 2011j). Section 4.3.1 describes the management areas in detail.

***Table 4.3.4-7 Management Areas for the Land Exchange Alternative B Lands***

| <b>Category</b>                            | <b>Land Exchange Alternative B Lands</b> |                |
|--------------------------------------------|------------------------------------------|----------------|
|                                            | <b>Acres</b>                             | <b>Percent</b> |
| General Forest                             | 355.3                                    | 7              |
| General Forest – Longer Rotation           | 4,397.3                                  | 93             |
| Potential/Candidate Research Natural Areas | 0.0                                      | 0              |
| Riparian Areas                             | 0.0                                      | 0              |

Source: USFS 2011j.

### ***Ecological Land Types***

The Alternative B: Smaller Federal Parcel lands contain the same five categories of ELTs as the federal lands. Section 4.3.4.1.1 provides a discussion of these ELT types.

### ***Management Indicator Habitats***

The Alternative B: Smaller Federal Parcel consists mostly of lowland black spruce-tamarack forest (MIH 9; 2,078.7 acres), with lesser amounts of upland conifer forest (MIH 5; 1,138.8 acres) and upland forest (MIH 1; 954.2 acres) (see Table 4.3.4-8 and Figure 4.2.4-4) (USFS 2010b). Aquatic habitats (MIH 14) are not tracked on the Alternative B: Smaller Federal Parcel lands, though several open water features are present. Though not considered an MIH type, the smaller federal parcel contains 385.4 acres of lowland shrub habitat and 115.4 acres of lowland emergent habitat, as well. The remaining acres present on the federal lands have no corresponding MIH classification.

The Alternative B: Smaller Federal Parcel consists of mostly mature (2,574.7 acres) forest stands, with smaller amounts of immature (1,325.9 acres) stands and young (271.1 acres) stands (see Table 4.3.4-8). There are currently no patches of mature upland forest over 300 acres on the Alternative B: Smaller Federal lands (USFS 2012c). However, since smaller patches will grow over time into larger contiguous patches, the USFS predicts that in 2020, there would be one patch (707.8 acres) over 300 acres on the Alternative B: Smaller Federal lands (USFS 2012d).

**Table 4.3.4-8 MIH Types and Age Classes (Acres) for the Land Exchange Alternative B Lands**

| MIH Type         | Total of Land Exchange Alternative B Parcel Lands |
|------------------|---------------------------------------------------|
| MIH 1            | 954.2                                             |
| MIH 5            | 1,138.8                                           |
| MIH 9            | 2,078.7                                           |
| MIH 14           | 0.0                                               |
| Lowland Shrub    | 385.4                                             |
| Lowland Emergent | 115.4                                             |
| Upland Grass     | 0.0                                               |
| Age Class        |                                                   |
| Young            | 271.1                                             |
| Immature         | 1,325.9                                           |
| Mature           | 2,574.7                                           |

Sources: USFS 2010b; USFS 2011i.

### **Landscape Ecosystems**

The Alternative B: Smaller Federal Parcel lands are located within two landscape ecosystem types. The Jack Pine-Black Spruce landscape ecosystem occupies 2,395.1 acres of the smaller federal parcel lands (represents less than 0.01 percent of Jack Pine-Black Spruce landscape ecosystem), while the Lowland Conifer landscape ecosystem occupies 2,349.1 acres (represents less than 0.01 percent of Lowland Conifer landscape ecosystem) (see Table 4.3.4-9).

**Table 4.3.4-9 Landscape Ecosystem Types (Acres) on the Land Exchange Alternative B Lands and Tract 1 Lands<sup>1</sup>**

| Landscape Ecosystem Type     | Alternative B: Smaller Federal Parcel Lands <sup>2</sup> | Tract 1 – Hay Lake |
|------------------------------|----------------------------------------------------------|--------------------|
| Dry-Mesic Red and White Pine | 0.0                                                      | 589.2              |
| Mesic Red and White Pine     | 0.0                                                      | 528.0              |
| Jack Pine-Black Spruce       | 2,395.1                                                  | 983.5              |
| Lowland Conifer              | 2,349.1                                                  | 2,835.3            |
| Mesic Birch-Aspen-Spruce-Fir | 0.0                                                      | 0.9                |
| Lowland Hardwood             | 0.0                                                      | 0.0                |
| Sugar Maple                  | 0.0                                                      | 0.0                |

Source: USFS 2011g.

Notes:

<sup>1</sup> Total acres may be more or less than presented elsewhere due to rounding or GIS layers used.

<sup>2</sup> Data may not have complete coverage of parcel.

### **Invasive Non-native Plants**

The Alternative B: Smaller Federal Parcel lands contain similar invasive non-native species as those that are part of the Land Exchange Proposed Action, since they occupy a smaller portion of the federal lands.

## **Threatened and Endangered Plant Species**

### ***Endangered, Threatened, and Special Concern Plant Species***

The Alternative B: Smaller Federal Parcel contains the same threatened and endangered species as the federal lands since it occupies the same general area, and the ETSC species located on the federal lands are also located within the boundary of the smaller federal parcel. Section 4.3.4.1.1 provides the list of species that occur on the Alternative B: Smaller Federal Parcel lands.

### ***Regional Foresters Sensitive Species***

The RFSS plants located on the smaller federal parcel are the same as those located on the federal lands and Mine Site. Sections 4.2.4.2.3 and 4.3.4.1.1 provide a list and discussion of these species.

## **4.3.4.2 Non-federal Lands**

### **4.3.4.2.1 Cover Types**

The non-federal lands portion of the Land Exchange Proposed Action includes five different private tracts of land that total up to 7,075.0 acres. These lands, which include forest and wetland habitat, are located throughout the Superior National Forest in St. Louis, Lake, and Cook counties.

### **4.3.4.2.2 Habitat Types**

The MDNR GAP land cover types of the combined non-federal lands consist of mostly lowland coniferous forests, shrublands, and upland deciduous forests (see Table 4.3.4-10).

**Table 4.3.4-10 Non-federal Lands Cover Types**

| Cover Types                                        | Total Acres                  | Percent of Area         |
|----------------------------------------------------|------------------------------|-------------------------|
| Lowland coniferous forest <sup>1</sup>             | 2,920.5                      | 41                      |
| Shrubland                                          | 1,845.0                      | 26                      |
| Upland deciduous forest <sup>4</sup>               | 1,232.9                      | 17                      |
| Upland coniferous forest <sup>3</sup>              | 699.4                        | 10                      |
| Aquatic environments                               | 266.6                        | 4                       |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 50.4                         | 1                       |
| Cropland/grassland                                 | 31.7                         | <1                      |
| Lowland deciduous forest <sup>2</sup>              | 28.6                         | <1                      |
| Disturbed                                          | 0.0                          | 0                       |
| <b>Total</b>                                       | <b>7,075.0<sup>(6)</sup></b> | <b>99<sup>(7)</sup></b> |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

<sup>6</sup> Total acres may be more or less than presented due to rounding.

<sup>7</sup> Percent totals less than 100 percent due to rounding.

### **Management Areas**

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

### **Management Indicator Habitats**

MIH types and age classes were determined and mapped for the non-federal lands using several data sources, including field survey maps, aerial maps, surrounding federal MIH data, topographic maps, and USFS review. This analysis limited the MIH types to those mentioned above in Section 4.2.4.2.3, due to risk of misidentification of further subcategories of forests. Lowland shrub habitat, while not an MIH type, was also considered due to its importance to several wildlife species such as moose (USFS, Pers. Comm., October 26, 2011). Additionally, lowland emergent wetlands and upland grass types were included. The non-federal lands are dominated by lowland black spruce-tamarack forest (MIH 9; 3,308.5 acres) and upland forest (MIH 1; 2,694.5 acres), with lesser amounts of aquatic habitats (MIH 14; 226.7 acres) and upland conifer forest (MIH 5; 79.9 acres) (see Table 4.3.4-3). Though not considered MIH types, the non-federal lands also contain 385.7 acres of lowland emergent wetlands, 332.2 acres of lowland shrub habitat, and 43.3 acres of upland grassland.

Of forested plant communities on the non-federal lands, immature forest stands (3,539.7 acres) are most abundant, with lesser amounts of mature (1,824.6 acres) and young (778.2 acres) forest types.

### **Landscape Ecosystems**

The non-federal lands are located within seven landscape ecosystem types, including Jack Pine-Black Spruce, Lowland Conifer, Mesic Red and White Pine, Dry-Mesic Red and White Pine, Lowland Hardwood, Mesic Birch-Aspen-Spruce-Fir, and Sugar Maple (see Table 4.3.4-4). All landscape ecosystem types on each tract represent less than 0.01 percent of that landscape ecosystem type within the Northern Superior Uplands Section.

#### **4.3.4.2.3 Invasive Non-native Plants**

The non-federal lands contain similar invasive non-native species as the federal lands, although there are also different species. The subsections on each tract below provide more detailed discussions of these species.

#### **4.3.4.2.4 Threatened and Endangered Plant Species**

##### **Endangered, Threatened, and Special Concern Plant Species**

The non-federal lands contain three state-listed ETSC plant species according to the MDNR NHIS, including *Woodsia scopulina*, *Saxifraga paniculata*, and *Carex ormostachya*. The former two of these species are located on Tract 5, and the latter species is located on Tract 1. Additional information about these three species is presented in the discussion of Tracts 1 and 5 below. Rulemaking was conducted with the intent to update the list of ETSC species (*Minnesota Rules*, parts 6134.0100 to 6134.0400), with new listings becoming effective on August 19, 2013 (MDNR 2013h). This FEIS considers any new listings, or changes in the previous listings, associated with the updated list.

### **Regional Foresters Sensitive Species**

The non-federal lands are located outside the current boundaries of the Superior National Forest; however, following the Land Exchange Proposed Action, some or all of the non-federal lands could become National Forest System lands. The USFS currently manages 58 vascular and non-vascular plant species that are listed as RFSSs in the Superior National Forest (see Table 4.2.4-5). Detailed RFSS plant surveys have not been conducted on the private non-federal lands, but information from other field surveys and habitat preferences (MIH types) for each species is used to determine potential habitat or occurrences of RFSS plant species on the non-federal lands.

*Saxifraga paniculata* is located on the non-federal lands and it is also an RFSS plant. The non-federal lands consist of mostly lowland black spruce-tamarack forests (MIH 9), which means there is generally more habitat available for the 13 RFSS species listed under that category to occur on the non-federal lands, if suitable habitat exists for them (see Table 4.2.4-5). One of these species is *Pyrola minor*, which is a state-listed ETSC plant species that occurs on the federal lands. The non-federal lands also contain a large portion of upland forest (MIH 1), which means there are many acres for the 17 RFSS species listed under that category to occur on the non-federal lands as well. Three of these species are state-listed ETSC species on the federal lands and include *Botrychium pallidum*, *Botrychium rugulosum*, and *Botrychium simplex*. *Botrychium lanceolatum* is also known to occur near the southwest corner of the Tract 1 lands, and is associated with MIH 1. There is a smaller amount of aquatic habitat (MIH 14) available on the non-federal lands, so there is less available habitat for the eight RFSS species listed under that category. One of these species is *Caltha natans*, which is a state-listed ETSC plant species and occurs on the federal lands. There is very little upland conifer forest habitat (MIH 5) available, meaning there are likely fewer occurrences of some species in the MIH 5 category. There are also 385.7 acres of lowland emergent wetland habitat on the non-federal lands, so the five RFSS plant species listed under this category may occur on the non-federal lands as well. This includes *Eleocharis nitida* and *Juncus stygius*, which are both state-listed ETSC plant species that occur on the federal lands.

#### **4.3.4.2.5 Tract 1 – Hay Lake Lands**

The largest non-federal tract is Tract 1, which is 4,926.3 acres in size. It is located in the Laurentian Ranger District (USFS 2011n). The parcel has moderate topographic relief and slopes toward the east-northeast, in the direction of the Pike River (AECOM 2011b).

#### **Cover Types**

Tract 1 is located in the Nashwauk Uplands subsection of the Laurentian Mixed Forest Province ecoregion (MDNR 2006a). See Section 4.2.4.1 for a description of the Nashwauk Uplands subsection.

#### **Habitat Types**

The primary MDNR GAP land cover types for Tract 1 include shrublands and lowland conifer forests (see Table 4.3.4-11). There are fewer acres of cropland/grassland and lowland deciduous forests. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-11 Tract 1 – Hay Lake Lands Cover Types**

| Cover Types                                        | Total Acres                  | Percent of Area |
|----------------------------------------------------|------------------------------|-----------------|
| Shrubland                                          | 1,664.6                      | 34              |
| Lowland coniferous forest <sup>1</sup>             | 1,524.2                      | 31              |
| Upland deciduous forest <sup>4</sup>               | 999.9                        | 20              |
| Upland coniferous forest <sup>3</sup>              | 437.3                        | 9               |
| Aquatic environments                               | 251.1                        | 5               |
| Cropland/grassland                                 | 31.7                         | 1               |
| Lowland deciduous forest <sup>2</sup>              | 17.4                         | <1              |
| Disturbed                                          | 0.0                          | 0               |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 0.0                          | 0               |
| <b>Total</b>                                       | <b>4,926.3<sup>(6)</sup></b> | <b>100</b>      |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

<sup>6</sup> Total acres may be more or less than presented due to rounding.

### **Plant Community Surveys**

Much of Tract 1 (59 percent) is wetlands (AECOM 2011b). All of the 33 wetlands evaluated are rated high for wetland functions and values, according to MnRAM 3.2 (AECOM 2009b; AECOM 2011b). Most of the wetland habitats consist of scrub-shrub habitat dominated by speckled alder (*Alnus incana* ssp. *rugosa*), beaked hazel (*Corylus cornuta*), willows (*Salix* spp.), and bog birch (*Betula pumila*); pole and immature size coniferous forests dominated by black spruce, northern white cedar, and tamarack; and emergent/bog wetlands dominated by sedges (*Carex* spp.), cattail (*Typha* spp.), bog-Labrador tea, and leatherleaf (AECOM 2011b). There are several open water features on the parcel as well, including Hay Lake, Little Rice Lake, and the Pike River. See Section 4.3.3 for a more detailed description of wetland habitat types present.

Uplands consist of pole and immature deciduous forests, dominated by trembling aspen and paper birch, with midstories of sapling mountain maple (*Acer spicatum*), trembling aspen, paper birch, balsam fir, and black spruce. Shrub species include beaked hazel, with scattered speckled alder, twining honeysuckle (*Lonicera dioica*), and prickly rose (*Rosa acicularis*) (AECOM 2011b). The ground cover includes sedges, wild strawberry (*Fragaria virginiana*), bunchberry (*Cornus canadensis*), wild raspberry (*Rubus* spp.), horsetail (*Equisetum* spp.), clintonia (*Clintonia borealis*), twinflower (*Linnaea borealis*), large-leaved aster (*Aster macrophyllus*), rose twisted stalk (*Streptopus roseus*), skunk currant (*Ribes glandulosum*), spotted coralroot (*Corallorrhiza maculata*), wood anemone (*Anemone quinquefolia*), tall buttercup (*Ranunculus acris*), bracken fern (*Pteridium aquilinum*), and interrupted fern (*Osmunda claytoniana*) (AECOM 2011b).

Disturbed areas and grasslands are primarily associated with abandoned logging roads, landings, and powerline ROWs and are dominated by forbs and grasses, including cow parsnip (*Heracleum lanatum*), white clover (*Trifolium repens*), ox-eye daisy (*Leucanthemum vulgare*), tall buttercup, common sow thistle (*Sonchus arvensis* ssp. *uliginosus*), orange hawkweed

(*Hieracium aurantiacum*), American vetch (*Vicia americana*), wild strawberry, wild raspberry, and common tansy (AECOM 2011b).

Almost all forest stands on Tract 1 consist of trees that are 8 to 11 inches dbh, having been harvested in relatively recent years (AECOM 2011b). Upland deciduous trees range up to 16 inches dbh, while upland coniferous trees range up to 10 inches dbh. Upland forest stands in the northern, central, and southwestern portions of the parcel are pole to immature, while upland stands in the western portion of the parcel are sapling to young pole. The majority of the trees on the parcel are estimated to be 60 years or younger (AECOM 2011b).

### ***Minnesota Biological Survey***

There are no lands designated as MBS Sites of Biodiversity Significance on Tract 1 (see Figure 4.3.4-1); however, the entire parcel is located within the preliminary Pike Range and Peatlands MBS Site of Outstanding Biodiversity Significance and could potentially be the only site ranked as Outstanding in the Nashwauk Uplands subsection upon final designation by the MDNR (MDNR, Pers. Comm., February 14, 2012; MDNR *In progress*). The preliminary site is approximately 26,000 acres in size, approximately half of which is owned or managed by the Superior National Forest. On a larger landscape level, this site is one of the largest and most contiguous high-quality areas within the subsection or LTA scale. The Pike Mountain cRNA and Loka Lake cRNA abut Tract 1 and are included within this preliminary MBS site.

Native plant community designations are not available for Tract 1. However, native plant communities of the preliminary Pike Range and Peatlands MBS site are generally of high quality and include representative examples of almost all communities known to exist in the subsection (MDNR, Pers. Comm., April 9, 2012; MDNR n.d.).

### ***Scientific and Natural Areas***

There are no lands designated as SNAs on Tract 1; however, state, federal, and private land near the southwest corner of the parcel has been identified as a “potential” SNA site (MDNR, Pers. Comm., February 14, 2012). The federal lands bordering the southwest corner of the parcel are designated as the Pike Mountain cRNA, and this designation could be extended onto Tract 1 due to high-quality mature hardwood forest stands, rare cliff and rock outcrop features, and low human disturbance.

### ***Culturally Important Plants***

Wild rice has been observed on Tract 1, including on Hay Lake, Little Rice Lake, and the Pike River (Barr 2011a; 2012a; 2013l). Small populations of wild rice have been found on Hay Lake with less than 10 percent coverage, while Little Rice Lake has several locations with greater than 75 percent coverage of wild rice and continuous growth throughout the lake. Wild rice was also found along the Pike River flowing north into Little Rice Lake. The survey performed in 2012 found lower densities of wild rice beds. Hay Lake, Rice Lake, and the Pike River all had density factor ratings of 1. The decreases in density in Rice Lake and the Pike River were consistent with a decrease in wild rice bed density across all areas surveyed in 2012. Section 4.2.2 provides further discussion of wild rice on the Tract 1 lands.

As with the federal lands, natural resources culturally important to the Bands are discussed in Section 4.2.9.3.3.

### ***Management Areas***

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

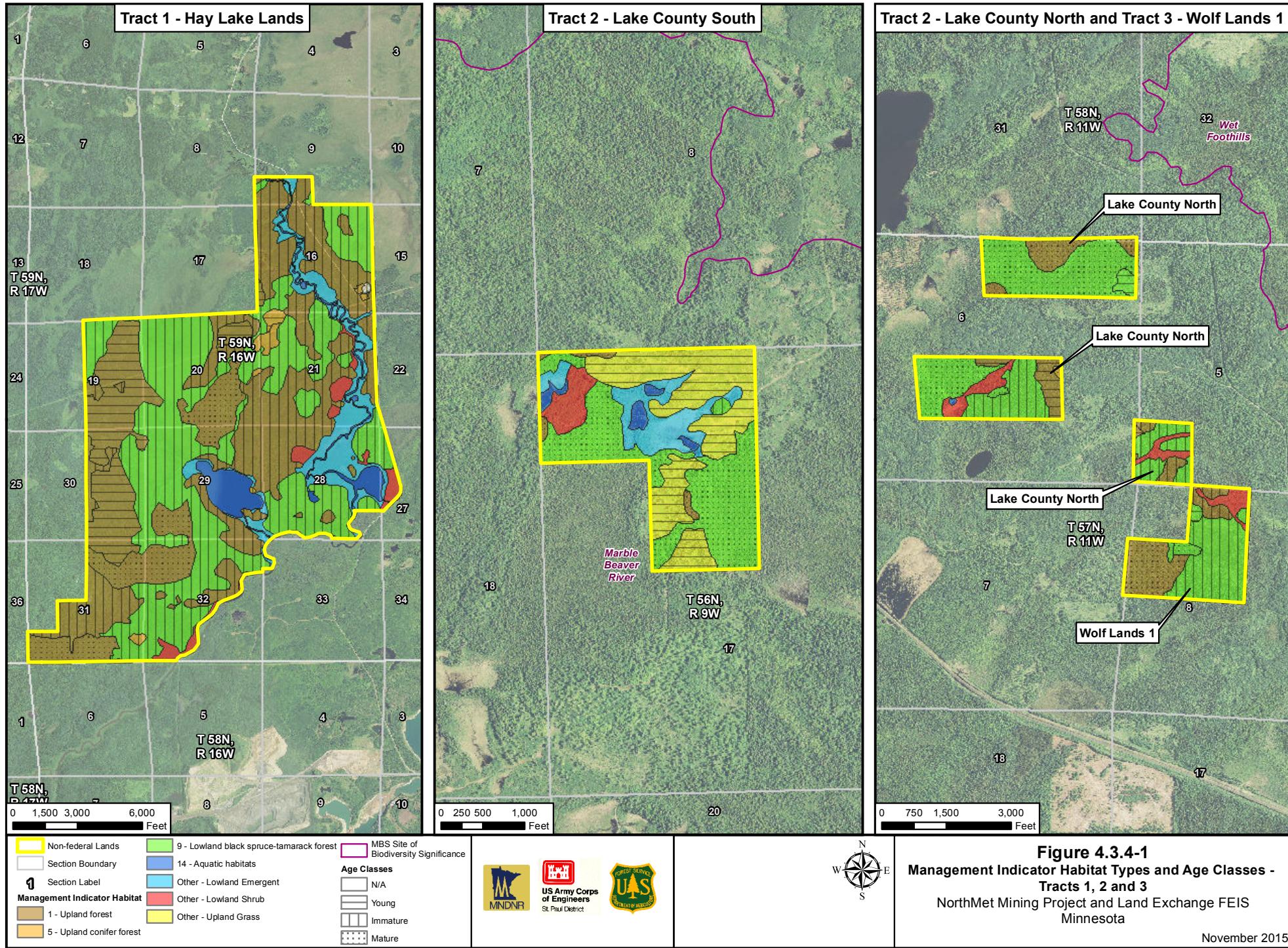
### ***Ecological Land Types***

Tract 1 contains six categories of ELTs, including Lowland Loamy Moist (ELT 1), Lowland Loamy Wet (ELT 2), Lowland Organic Acid to Neutral (ELT 6), Upland Deep Loamy Over Sandy Dry (ELT 11), Upland Shallow Loamy Dry (ELT 16), and Upland Extremely Shallow Loamy Droughty (ELT 18). The majority of Tract 1 is included within the Pike-Sandy River Sand Plain LTA and the remainder is within the Mesabi Range LTA.

### ***Management Indicator Habitats***

Table 4.3.4-3 provides a summary of the MIH types and age classes present on the Tract 1 lands (see Figure 4.3.4-1) (USFS 2010b). Though not considered MIHs, Tract 1 also contains 365.0 acres of lowland emergent wetlands and 113.3 acres of lowland shrub habitat.

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### ***Landscape Ecosystems***

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 1.

The Lowland Conifer landscape ecosystem occupies 2,835.3 acres of Tract 1. The Jack Pine-Black Spruce landscape ecosystem occupies 983.5 acres of Tract 1. The Mesic Red and White Pine landscape ecosystem occupies 528.0 acres of Tract 1. See the previous federal lands section above (see Section 4.3.4.1.1) for a description of these landscape ecosystem types.

The Dry-Mesic Red and White Pine landscape ecosystem occupies 589.2 acres of Tract 1. It comprises the following species: aspen, paper birch, red pine, white pine, jack pine, balsam fir, black spruce, white spruce, bigtooth aspen, and red maple (USFS 2004a). On drier sites, jack pine, red pine, and black spruce dominate, while the other species dominate on mesic sites. Succession after fire disturbances is similar to the Mesic Red and White Pine landscape ecosystem described above.

The Mesic Birch-Aspen-Spruce-Fir landscape ecosystem occupies less than 1 acre of Tract 1. It is dominated by mixed stands of aspen, paper birch, balsam fir, and white spruce, though northern white cedar, bigtooth aspen, and red maple are sometimes also present (USFS 2004a). Fire disturbances usually result in aspen/birch-dominated stand regeneration, while wind disturbances usually result in balsam fir and white spruce forests. The climax tree stage consists of a multi-aged white spruce and balsam fir forest with components of paper birch and northern white cedar.

### ***Invasive Non-native Plants***

According to the Superior National Forest invasive plant geodatabase, Tract 1 contains two known occurrences of common tansy (USFS 2010a). Common tansy can spread vegetatively or reproductively via tufted seeds that are dispersed by wind or water (MDNR 2011b). It is widespread and common along roadsides or abandoned farmyards in northern Minnesota. Common tansy was observed during field investigations along trails near recently installed gates and disturbed earthen berms. Additionally, AECOM (2011b) identified common tansy, orange hawkweed, common sow thistle, and ox-eye daisy within disturbed logging roads, landings, and power line rights-of-way. Orange hawkweed primarily spreads vegetatively through runners, rhizomes, and root buds, but can also spread reproductively (MDNR 2011b). It colonizes newly disturbed sites and early successional habitats quickly. Ox-eye daisy spreads vegetatively and reproductively, but often cannot invade intact grasslands (MDNR 2011b). It can, however, invade newly disturbed areas quickly. Common sow thistle spreads vegetatively and through wind-borne seeds or root cuttings. It colonizes fields, woodlands, and roadsides, but generally is not a threat to intact native plant communities (MDNR 2011b).

### ***Threatened and Endangered Plant Species***

#### ***Endangered, Threatened, and Special Concern Plant Species***

No federally listed ETSC plant species are known to occur on the Tract 1 lands according to field investigations (AECOM 2011b). Based on a review of the MDNR NHIS (MDNR 2014d), one state-listed species of special concern has been identified on Tract 1 (see Table 4.3.4-12 and Figure 4.3.4-3). Necklace sedge (*Carex ormostachya*) is not tracked by the USFS as an RFSS. No other state-listed species are known to occur on Tract 1.

Rulemaking was conducted with the intent to update the list of ETSC species (*Minnesota Rules*, parts 6134.0100 to 6134.0400), with new listings becoming effective on August 19, 2013 (MDNR 2013h). This FEIS considers any new listings, or changes in the previous listings, associated with the updated list.

**Table 4.3.4-12 Endangered, Threatened, and Special Concern Plant Species Identified on the Tract 1 Lands<sup>3</sup>**

| Common Name    | Scientific Name          | State Status <sup>1</sup> | No. of Populations | No. of Individuals <sup>2</sup> | Habitat and Location                                                |
|----------------|--------------------------|---------------------------|--------------------|---------------------------------|---------------------------------------------------------------------|
| Necklace sedge | <i>Carex ormostachya</i> | SC                        | 1                  | >20                             | Dry/mesic shallow soils on rock outcrop in red oak-dominated forest |

Sources: MDNR 2014d.

Notes:

<sup>1</sup> E - Endangered, T - Threatened, SC - Species of Special Concern.

<sup>2</sup> Where the number of individuals cannot be determined without damaging the population, then patch size is used as a representative abundance measure.

<sup>3</sup> Data included here were provided by the Division of Ecological Resources, MDNR, and were current as of August 5, 2014. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.

### Species Life Histories

The following summary provides a description of the life history, state-wide distribution, and sensitivity to disturbance for the species of special concern found on Tract 1.

Necklace sedge (*Carex ormostachya*) is listed as a species of special concern in Minnesota and is globally ranked as apparently secure; it is not listed as an RFSS in the Superior National Forest. The species was first documented in Cook County, Minnesota in 1938, and has since been reported across northern Minnesota (Bell Museum of Natural History 2014). *C. ormostachya* reaches the southwest corner of its range in Minnesota (NatureServe 2014b). It typically occurs in moist to dry deciduous, evergreen, or mixed forests, often in sandy gravel or disturbed soils (eFlora 2014). *C. ormostachya* is a perennial herbaceous species that flowers and fruits in spring to summer.

### **Regional Foresters Sensitive Species**

There is more upland forest (MIH 1) and lowland black spruce-tamarack forest (MIH 9) habitat available than any other type, so the RFSS plants associated with these types would be most likely to occur on Tract 1. *Botrychium lanceolatum* is known to occur near the southwest corner of the Tract 1 lands, and is associated with MIH 1. There is a moderate amount of aquatic habitat (MIH 14) and a smaller amount of upland conifer forest (MIH 5), so RFSS plants associated with these would be less likely to occur.

### **4.3.4.2.6 Tract 2 – Lake County Lands**

Tract 2 is 381.9 acres in size and includes several subparcels ranging in size from 44 to 117 acres on the Laurentian Ranger District southeast of Seven Beaver Lake that are mostly surrounded by the Superior National Forest (USFS 2011n). Tract 2 is divided into north (Lake County North) and south (Lake County South) parcels, with the north parcel being the larger of the two. Lake

County North consists of three subparcels, which are made up of mostly wetland habitats; the majority of Lake County South lands consists of wetland habitats as well (AECOM 2011c).

### **Lake County North**

#### ***Cover Types***

The Tract 2 is located in the Laurentian Mixed Forest Province ecoregion. Lake County North is located in the Laurentian Uplands subsection of the Laurentian Mixed Forest Province ecoregion (MDNR 2006a). Section 4.2.4.1 provides a description of the Laurentian Uplands subsection.

#### **Habitat Types**

The primary MDNR GAP land cover type on the Tract 2 – Lake County North lands is lowland coniferous forest (see Table 4.3.4-13). It contains very few acres of aquatic environments or lowland deciduous forests. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

***Table 4.3.4-13 Tract 2 – Lake County North Cover Types***

| <b>Cover Types</b>                                 | <b>Total Acres</b>         | <b>Percent of Area</b>   |
|----------------------------------------------------|----------------------------|--------------------------|
| Lowland coniferous forest <sup>1</sup>             | 133.0                      | 50                       |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 34.0                       | 13                       |
| Upland deciduous forest <sup>4</sup>               | 34.0                       | 13                       |
| Upland coniferous forest <sup>3</sup>              | 32.8                       | 12                       |
| Shrubland                                          | 28.1                       | 11                       |
| Aquatic environments                               | 1.8                        | 1                        |
| Lowland deciduous forest <sup>2</sup>              | 1.4                        | 1                        |
| Cropland/grassland                                 | 0.0                        | 0                        |
| Disturbed                                          | 0.0                        | 0                        |
| <b>Total</b>                                       | <b>265.1<sup>(6)</sup></b> | <b>101<sup>(7)</sup></b> |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

<sup>6</sup> Total acres may be more or less than presented due to rounding.

<sup>7</sup> Percent totals are greater than 100 percent due to rounding.

#### **Plant Community Surveys**

The primary cover types are pole coniferous forest on the wetlands and mature and pole deciduous forests on the uplands (AECOM 2011c). Wetlands are dominated by northern white cedar, black spruce, and tamarack; balsam fir is a common understory species. Lake County North also contains scrub-shrub habitats that are dominated by speckled alder and contain emergent wetlands that consist of sedges and Canada bluejoint (*Calamagrostis canadensis*). Lake County North has several open bog areas, a beaver pond, and drainages as well. See Section 4.3.3 for a more detailed description of wetland habitat types present.

Upland habitats are dominated by immature paper birch and black spruce, but recently logged areas support sapling paper birch stands or shrub habitats. The midstory is comprised of balsam fir, black spruce, and beaked hazel. Areas that have been recently logged are dominated by sapling paper birch with scattered sapling trembling aspen and pole paper birch. Beaked hazel forms a patchy shrub layer, with several grasses and forbs in the ground layer (AECOM 2011c). Older forests near logged areas contain large amounts of downed woody debris, and have a midstory dominated by dense stands of balsam fir, black spruce, and northern white cedar.

Lake County North wetland canopy trees range from 6 to 10 inches dbh, but northern white cedar up to 20 inches dbh and black spruce up to 14 inches dbh are found on the subparcels (AECOM 2011c). The north parcel also contains an immature forested wetland containing black ash (*Fraxinus nigra*) trees up to 16 inches dbh.

#### *Minnesota Biological Survey*

There are no MBS Sites of Biodiversity Significance located on the Lake County North subparcels (see Figure 4.3.4-1) (MDNR 2008a). However, Lake County North is located on the potential Seven Beavers MBS Site, which has not yet been finalized by the MDNR but is ranked as having Moderate to High Biodiversity Significance (MDNR 2007a).

Native plant community rankings for Lake County North are not available.

#### *Scientific and Natural Areas*

There are no lands designated as SNAs on Tract 2 – Lake County North.

#### *Culturally Important Plants*

A discussion of natural resources culturally important to the Bands is presented in Section 4.2.9.3.3.

#### *Management Areas*

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

#### *Ecological Land Types*

The Lake County North parcel contains five categories of ELTs, including Lowland Loamy Moist (ELT 1), Lowland Loamy Wet (ELT 2), Lowland Organic Acid to Neutral (ELT 6), Upland Deep Loamy Dry Course (ELT 13), and Upland Deep Medium Loamy Dry (ELT 14). All three subparcels of the Lake County North parcel are included in the Greenwood Lake Till Plain LTA.

#### *Management Indicator Habitats*

Table 4.3.4-3 provides a summary of the MIH types and age classes present on Tract 2 (see Figure 4.3.4-1) (USFS 2010b). Though not considered an MIH, the Lake County North parcel also contains 20.6 acres of lowland shrub habitat.

### Landscape Ecosystems

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 2.

The Lowland Conifer landscape ecosystem occupies 227.6 acres of Lake County North. The Mesic Birch-Aspen-Spruce-Fir landscape ecosystem occupies 37.4 acres of the Lake County North lands. See the federal or non-federal lands sections above for a description of these landscape ecosystem types.

### Lake County South

#### **Cover Types**

The Lake County South parcel is located in the North Shore Highlands subsection of the Laurentian Mixed Forest Province ecoregion (MDNR 2006a). Most of the vegetative cover types in the North Shore Highlands subsection grow in thin, rocky red and brown glacial till (MDNR 2011g). Upper Precambrian bedrock is often exposed at the surface. The most common soils are loams and sandy loams, which support forest communities of white pine, red pine, jack pine, balsam fir, white spruce, and aspen-birch.

#### Habitat Types

The primary MDNR GAP land cover types on Tract 2 – Lake County South are lowland coniferous forest and upland coniferous forest (see Table 4.3.4-14). There are fewer acres of aquatic environments. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-14 Tract 2 – Lake County South Cover Types**

| <b>Cover Types</b>                                 | <b>Total Acres</b>         | <b>Percent of Area</b>  |
|----------------------------------------------------|----------------------------|-------------------------|
| Lowland coniferous forest <sup>1</sup>             | 53.1                       | 45                      |
| Upland coniferous forest <sup>3</sup>              | 38.8                       | 33                      |
| Shrubland                                          | 10.8                       | 9                       |
| Upland deciduous forest <sup>4</sup>               | 10.1                       | 9                       |
| Aquatic environments                               | 4.0                        | 3                       |
| Cropland/grassland                                 | 0.0                        | 0                       |
| Disturbed                                          | 0.0                        | 0                       |
| Lowland deciduous forest <sup>2</sup>              | 0.0                        | 0                       |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 0.0                        | 0                       |
| <b>Total</b>                                       | <b>116.8<sup>(6)</sup></b> | <b>99<sup>(7)</sup></b> |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

<sup>6</sup> Total acres may be more or less than presented due to rounding.

<sup>7</sup> Percent totals are less than 100 percent due to rounding.

### Plant Community Surveys

The primary cover types on Tract 2 – Lake County South are similar to Tract 2 – Lake County North, with wetlands dominated by pole coniferous forest and upland areas dominated by immature paper birch, black spruce, jack pine, eastern white pine, and northern white cedar. There are five beaver ponds, surrounded by emergent wetland species, including sedges, narrow-leaved cattail (*Typha angustifolia*), woolgrass (*Scirpus cyperinus*), and Canada bluejoint (AECOM 2011c). Please see Section 4.3.3 for a more detailed description of wetland habitat types present.

Most upland areas on Tract 2 – Lake County South have been recently clear-cut, except the southwest portion of the parcel. This area has been partially thinned, leaving areas where immature paper birch, black spruce, jack pine, eastern white pine, and northern white cedar trees remain ranging from 12 to 24 inches dbh (AECOM 2011c). The midstory includes balsam fir and beaked hazel. Grasses and forbs dominate the ground layer.

### Minnesota Biological Survey

The entire 116.9 acres of the Tract 2 – Lake County South parcel are located within the Marble Beaver River MBS Site of High Biodiversity Significance (see Figure 4.3.4-1) (MDNR 2008a). This site is located within the North Shore Highlands subsection.

Native plant communities have been identified for the Lake County South parcel. It contains one vegetation community, sugar maple (*Acer saccharum*) forest (MHn45c; 8 percent of parcel), which has been characterized as “vulnerable” in the state (MDNR 2008b). Black ash-conifer swamps (WFn64a; less than 1 percent of parcel) and lowland white cedar forests (WFn53a; 29 percent of parcel) are also present on the parcel and are ranked as “apparently secure” in Minnesota based on abundance, distribution, trends, and threats (MDNR 2008b).

### Scientific and Natural Areas

There are no lands designated as SNAs on Tract 2 – Lake County South.

### Culturally Important Plants

A discussion of natural resources culturally important to the Bands is presented in Section 4.2.9.3.3.

### Management Areas

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

### Ecological Land Types

Tract 2 – Lake County South contains two categories of ELTs, including Lowland Loamy Wet (ELT 2), and Upland Deep Medium Loamy Dry (ELT 14). The entire Lake County South parcel is included in the Tettegouche Till Plain LTA.

### Management Indicator Habitats

Table 4.3.4-3 provides a summary of the MIH types and age classes present on Tract 2 lands (see Figure 4.3.4-1) (USFS 2010b). Though not considered MIHs, the Tract 2 – Lake County South parcel also contains 43.3 acres of upland grassland, 15.6 acres of lowland emergent wetland, and 6.4 acres of lowland shrub habitat.

### Landscape Ecosystems

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 2 lands.

The Lowland Conifer landscape ecosystem occupies 80.2 acres of Tract 2 – Lake County South. See the federal or non-federal lands sections above for a description of this landscape ecosystem type.

The Sugar Maple landscape ecosystem occupies 36.7 acres of Tract 2 – Lake County South. It generally is located in a band within 15 miles of Lake Superior and is dominated by sugar maple with yellow birch, although northern white cedar, basswood, red maple, and northern red oak may also be present (USFS 2004a). Fire and wind disturbances are very infrequent, leaving individual tree mortality as the principal disturbance.

### ***Invasive Non-native Plants***

According to the Superior National Forest invasive plant geodatabase, there are no known occurrences of invasive species on the Tract 2 lands (USFS 2010a). Field studies indicate that one area of Tract 2 – Lake County North and several areas in the Tract 2 – Lake County South parcel contain occurrences of thistles and ox-eye daisy in a recently clear-cut habitat (AECOM 2011c).

### ***Threatened and Endangered Plant Species***

#### Endangered, Threatened, and Special Concern Plant Species

Based on a review of the MDNR NHIS and field investigations, no federally or state-listed ETSC plant species are known to occur on the Tract 2 lands.

#### Regional Foresters Sensitive Species

There is more lowland black spruce-tamarack forest (MIH 9) and upland forest (MIH 1) habitat available than any other type, so the RFSS plants associated with these types would be most likely to occur on the Tract 2 lands. There is a very small amount of upland conifer forest (MIH 5) or aquatic habitat (MIH 14) so RFSS plants associated with these would be less likely to occur.

### **4.3.4.2.7 Tract 3 – Wolf Lands**

Tract 3 is 1,575.8 acres in size and is located on the Laurentian and Tofte Ranger Districts. Tract 3 includes four separate parcels ranging in size from 126 to 768 acres, referred to here as Tract 3 – Wolf Lands 1 through 4, which would complement Superior National Forest ownership by reducing federal exterior boundaries and eliminating several private ownership patterns (USFS 2011n). Tract 3 lands are located east to southeast of the federal lands and Tract 3 – Wolf Lands 1 is adjacent to Tract 2 – Lake County North.

### **Cover Types**

Tract 3 lands are located in the Laurentian Uplands subsection of the Laurentian Mixed Forest Province ecoregion (MDNR 2006a). Section 4.2.4.1 provides a description of the Laurentian Uplands subsection.

#### ***Tract 3 – Wolf Lands 1***

##### **Habitat Types**

The primary MDNR GAP land cover type on the Tract 3 – Wolf Lands 1 parcel is lowland coniferous forest (see Table 4.3.4-15). It has fewer acres of shrubland and mixed upland forests. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

***Table 4.3.4-15 Tract 3 – Wolf Lands 1 Cover Types***

| <b>Cover Types</b>                                 | <b>Total Acres</b>         | <b>Percent of Area</b> |
|----------------------------------------------------|----------------------------|------------------------|
| Lowland coniferous forest <sup>1</sup>             | 74.8                       | 59                     |
| Upland deciduous forest <sup>4</sup>               | 27.2                       | 22                     |
| Upland coniferous forest <sup>3</sup>              | 13.3                       | 11                     |
| Shrubland                                          | 6.9                        | 5                      |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 3.7                        | 3                      |
| Aquatic environments                               | 0.0                        | 0                      |
| Cropland/grassland                                 | 0.0                        | 0                      |
| Disturbed                                          | 0.0                        | 0                      |
| Lowland deciduous forest <sup>2</sup>              | 0.0                        | 0                      |
| <b>Total</b>                                       | <b>125.9<sup>(6)</sup></b> | <b>100</b>             |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

<sup>6</sup> Total acres may be more or less than presented due to rounding.

##### **Plant Community Surveys**

The primary cover types on Tract 3 – Wolf Lands 1 are pole coniferous forest on the wetlands, and immature mixed forest on the uplands (AECOM 2011c). The wetlands contain equal amounts of open, bog-like communities of sapling black spruce, northern white cedar, and tamarack, and denser pole forests of these same species, in addition to balsam fir. Please see Section 4.3.3 for a more detailed description of wetland habitat types present. Uplands are dominated by deciduous and coniferous immature forest with paper birch, trembling aspen, and balsam fir. Shrub species include beaked hazel and red-osier dogwood (*Cornus stolonifera*) (AECOM 2011c).

The majority of the Tract 3 – Wolf Lands 1 consists of wetland pole coniferous trees from 6 to 10 inches dbh, while the mature mixed forest trees on uplands are 12 inches dbh or greater (AECOM 2011c).

#### *Minnesota Biological Survey*

There are no designated MBS Sites of Biodiversity Significance located on the Tract 3 –Wolf Lands 1 parcel (see Figure 4.3.4-1) (MDNR 2008a). However, Tract 3 – Wolf Lands 1 is located on a potential MBS Site of Moderate to High Biodiversity Significance that has not yet been finalized by the MDNR (MDNR 2007a).

Native plant community rankings for Tract 3 are not available.

#### *Scientific and Natural Areas*

There are no SNAs located on the Tract 3 parcels.

#### *Culturally Important Plants*

A discussion of natural resources culturally important to the Bands is presented in Section 4.2.9.3.3.

#### *Management Areas*

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

#### *Ecological Land Types*

Tract 3 – Wolf Lands 1 contains three categories of ELTs, including Lowland Loamy Wet (ELT 2), Lowland Organic Acid to Neutral (ELT 6), and Upland Deep Medium Loamy Dry (ELT 14). The entire Tract 3 – Wolf Lands 1 parcel is included in the Greenwood Lake Till Plain LTA.

#### *Management Indicator Habitats*

Table 4.3.4-3 provides a summary of the MIH types and age classes present on Tract 3 lands (see Figure 4.3.4-1) (USFS 2010b). Though not considered an MIH, the Tract 3 – Wolf Lands 1 parcel also contains 9.7 acres of lowland shrub habitat.

#### *Landscape Ecosystems*

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 3 lands.

The Lowland Conifer landscape ecosystem occupies 84.3 acres of the Tract 3 – Wolf Lands 1 parcel. The Mesic Birch-Aspen-Spruce-Fir landscape ecosystem occupies 41.5 acres of the Tract 3 – Wolf Lands 1 parcel. See the federal or non-federal lands sections above for a description of these landscape ecosystem types.

### **Tract 3 – Wolf Lands 2**

#### Habitat Types

The primary MDNR GAP land cover type on the Tract 3 – Wolf Lands 2 parcel is lowland coniferous forest (see Table 4.3.4-16). The least abundant cover types include lowland deciduous forest and mixed upland forests. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-16 Tract 3 – Wolf Lands 2 Cover Types**

| Cover Types                                        | Total Acres  | Percent of Area |
|----------------------------------------------------|--------------|-----------------|
| Lowland coniferous forest <sup>1</sup>             | 586.2        | 76              |
| Upland coniferous forest <sup>3</sup>              | 86.5         | 11              |
| Shrubland                                          | 54.0         | 7               |
| Upland deciduous forest <sup>4</sup>               | 29.9         | 4               |
| Lowland deciduous forest <sup>2</sup>              | 5.8          | 1               |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 5.5          | 1               |
| Aquatic environments                               | 0.0          | 0               |
| Cropland/grassland                                 | 0.0          | 0               |
| Disturbed                                          | 0.0          | 0               |
| <b>Total</b>                                       | <b>767.9</b> | <b>100</b>      |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

#### Plant Community Surveys

Tract 3 – Wolf Lands 2 consists of mostly wetland habitats dominated by either pole black spruce, northern white cedar, or a mix of the two (AECOM 2011c). Midstory cover types in these forests consist of sapling black spruce, northern white cedar, or balsam fir. Scrub-shrub habitats of speckled alder dominate drainage areas. Some bogs, emergent wetlands, and beaver ponds exist on the parcel. Section 4.3.3 presents a more detailed description of wetland habitat types present.

Upland habitats consist of pole or immature mixed coniferous-deciduous forest types, including paper birch, trembling aspen, and black spruce, with a midstory of balsam fir and shrub layer of beaked hazel (AECOM 2011c).

The majority of Tract 3 – Wolf Lands 2 consists of wetland coniferous forests with canopy trees ranging from 4 to 8 inches dbh. An upland area in the northern portion of the parcel was logged in the past, and so the canopy cover in this area consists of immature coniferous and deciduous trees ranging from 5 to 12 inches dbh (AECOM 2011c).

*Minnesota Biological Survey*

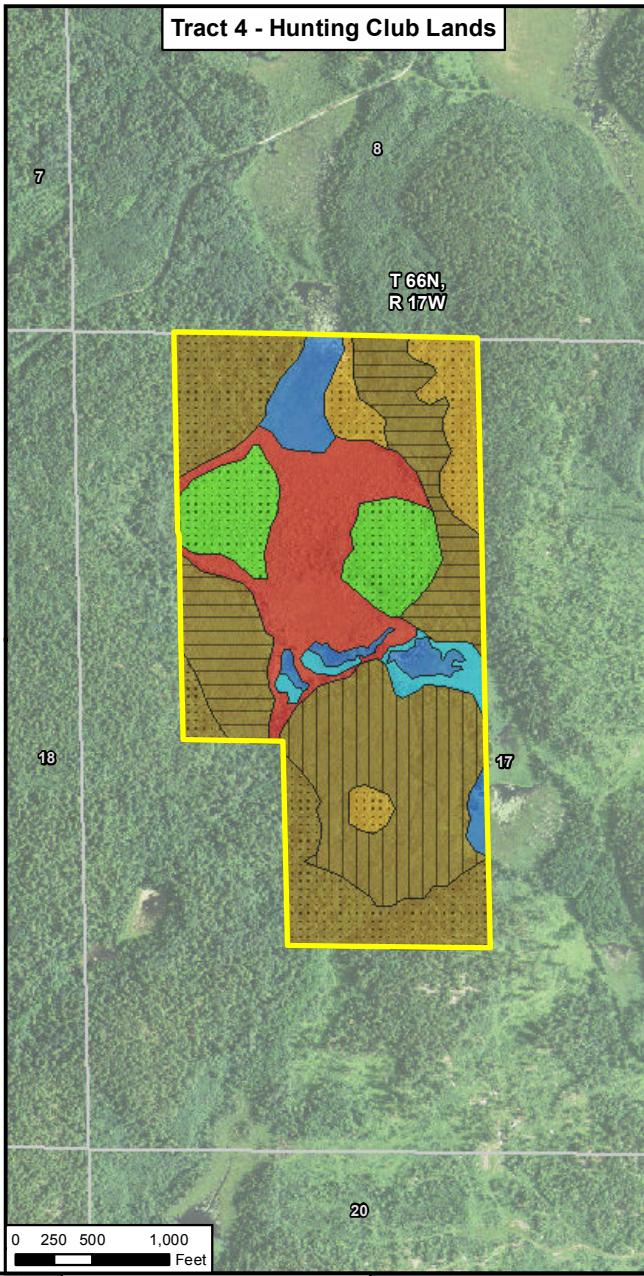
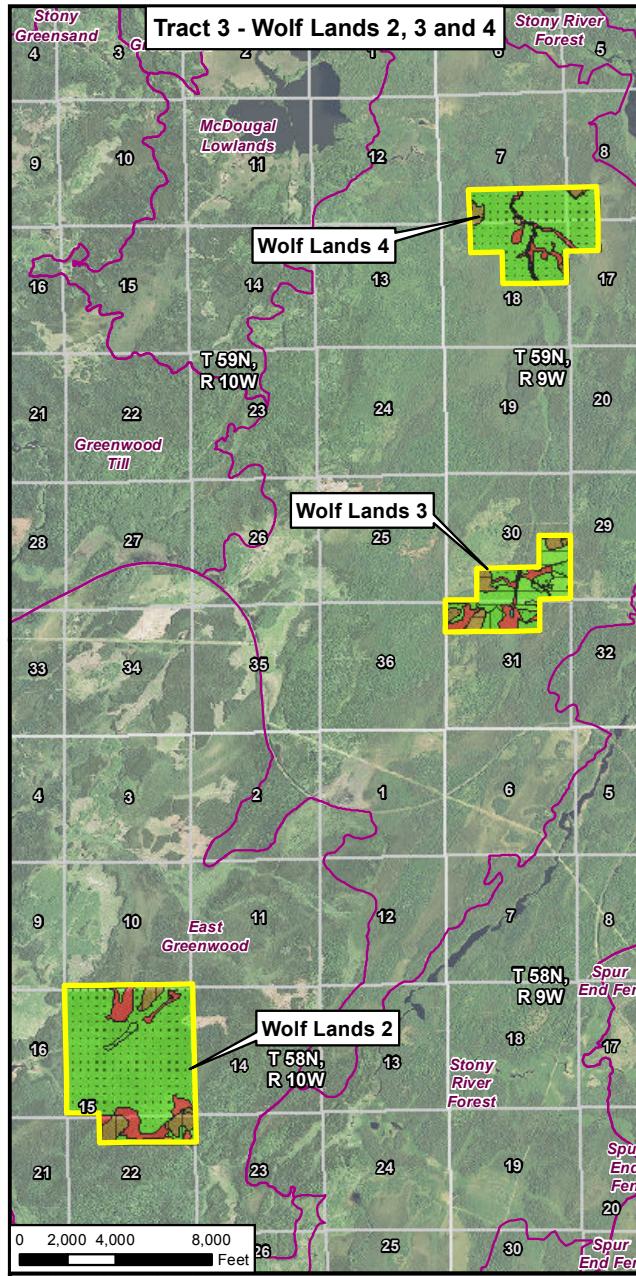
The entire 767.9 acres of the Tract 3 – Wolf Lands 2 parcel is located within the East Greenwood MBS Site of Moderate Biodiversity Significance (see Figure 4.3.4-2) (MDNR 2007a; MDNR 2008a). This site is located in the Laurentian Uplands subsection. Sites of Moderate Biodiversity Significance are sites that contain occurrences of rare species and/or moderately disturbed native plant communities or landscapes that have a strong potential for recovery.

Native plant community rankings for Tract 3 are not available.

*Scientific and Natural Areas*

There are no SNAs located on the Tract 3 parcels.

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**Legend:**

- Non-federal Lands
- Section Boundary
- Section Label
- Management Indicator Habitat
- 1 - Upland forest
- 5 - Upland conifer forest
- 9 - Lowland black spruce-tamarack forest
- 14 - Aquatic habitats
- Other - Lowland Emergent
- Other - Lowland Shrub
- Other - Upland Grass
- MBS Site of Biodiversity Significance
- N/A
- Young
- Immature
- Mature



**Figure 4.3.4-2**  
**Management Indicator Habitat Types and Age Classes -**  
**Tracts 3, 4 and 5**  
NorthMet Mining Project and Land Exchange FEIS  
Minnesota

November 2015

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### Culturally Important Plants

A discussion of natural resources culturally important to the Bands is presented in Section 4.2.9.3.3.

### Management Areas

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

### Ecological Land Types

Tract 3 – Wolf Lands 2 contains four categories of ELTs, including Lowland Loamy Moist (ELT 1), Lowland Loamy Wet (ELT 2), Upland Deep Loamy Dry Course (ELT 13), and Upland Deep Medium Loamy Dry (ELT 14). The entire Wolf Lands 2 parcel is included in the Greenwood Lake Till Plain LTA.

### Management Indicator Habitats

Table 4.3.4-3 provides a summary of the MIH types and age classes present on Tract 3 lands (see Figure 4.3.4-2) (USFS 2010b). Though not considered an MIH, the Tract 3 – Wolf Lands 2 parcel also contains 76 acres of lowland shrub habitat. The Tract 3 – Wolf Lands 2 parcel contains one patch of mature forest over 300 acres (598.2 acres), which is an important habitat type. However, this is different from the USFS Patch layer discussed in Section 4.3.4.1.1.

### Landscape Ecosystems

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 3 lands.

The Lowland Conifer landscape ecosystem occupies 653.2 acres of the Tract 3 – Wolf Lands 2 parcel. The Mesic Birch-Aspen-Spruce-Fir landscape ecosystem occupies 114.7 acres of the Tract 3 – Wolf Lands 2 parcel. Previous federal or non-federal land sections present descriptions of these landscape ecosystem types.

## **Tract 3 – Wolf Lands 3**

### Habitat Types

The primary MDNR GAP land cover type on the Tract 3 – Wolf Lands 3 parcel is lowland coniferous forest (see Table 4.3.4-17). The upland deciduous forest and mixed upland forest types are least represented. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-17 Tract 3 – Wolf Lands 3 Cover Types**

| Cover Types                                        | Total Acres  | Percent of Area         |
|----------------------------------------------------|--------------|-------------------------|
| Lowland coniferous forest <sup>1</sup>             | 183.8        | 66                      |
| Upland coniferous forest <sup>3</sup>              | 46.4         | 17                      |
| Shrubland                                          | 31.7         | 11                      |
| Upland deciduous forest <sup>4</sup>               | 12.4         | 4                       |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 3.1          | 1                       |
| Aquatic environments                               | 0.0          | 0                       |
| Cropland/grassland                                 | 0.0          | 0                       |
| Disturbed                                          | 0.0          | 0                       |
| Lowland deciduous forest <sup>2</sup>              | 0.0          | 0                       |
| <b>Total</b>                                       | <b>277.4</b> | <b>99<sup>(6)</sup></b> |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

<sup>6</sup> Percent totals less than 100 percent due to rounding.

#### Plant Community Surveys

The Tract 3 – Wolf Lands 3 parcel also consists of mostly wetland habitats (AECOM 2011c). Coyote Creek runs through the parcel and is bordered by sedge meadow wetlands, consisting of sedges, narrow-leaved cattail, and Canada bluejoint. Roughly half of the parcel has been recently logged. Logged wetlands are dominated by grasses, forbs, and shrubs, including red-osier dogwood and speckled alder. Unlogged wetlands consist of pole black spruce, with tamarack and balsam fir also present. Please see Section 4.3.3 for a more detailed description of wetland habitat types.

Upland areas within the parcel have been recently logged and most of these areas have few remaining trees. Logged uplands are dominated by grasses, forbs, and beaked hazel, but some areas still support paper birch and scattered balsam fir. The upland habitat bordering the parcel consists of young and mature paper birch with scattered black spruce and northern white cedar over an understory of balsam fir (AECOM 2011c).

Tract 3 – Wolf Lands 3 consists of pole coniferous trees in wetlands and sapling or mature mixed forest trees on uplands, which range from 0 to 4 inches dbh or 12 inches dbh or greater, respectively (AECOM 2011c). Unlogged wetland forests on the Tract 3 – Wolf Lands 3 parcel range from 4 to 10 inches dbh. Logged upland areas still support paper birches that are up to 16 inches dbh.

#### Minnesota Biological Survey

There are no designated MBS Sites of Biodiversity Significance located on the Tract 3 – Wolf Lands 3 parcel (see Figure 4.3.4-2) (MDNR 2008a). However, Tract 3 – Wolf Lands 3 is located on a potential MBS Site of Moderate to High Biodiversity Significance that has not yet been finalized by the MDNR (MDNR 2007a).

Native plant community rankings for Tract 3 are not available.

*Scientific and Natural Areas*

There are no SNAs located on the Tract 3 parcels.

*Culturally Important Plants*

A discussion of natural resources culturally important to the Bands is presented in Section 4.2.9.3.3.

*Management Areas*

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

*Ecological Land Types*

Tract 3 – Wolf Lands 3 contains three categories of ELTs, including Lowland Loamy Moist (ELT 1), Lowland Loamy Wet (ELT 2), and Lowland Organic Acid to Neutral (ELT 6). The entire Tract 3 – Wolf Lands 3 parcel is included in the Greenwood Lake Till Plain LTA.

*Management Indicator Habitats*

Table 4.3.4-3 provides a summary of the MIH types and age classes present on Tract 3 lands (see Figure 4.3.4-2) (USFS 2010b). Though not considered MIHs, the Tract 3 – Wolf Lands 3 parcel also contains 48.6 acres of lowland shrub habitat and less than an acre of lowland emergent habitat.

*Landscape Ecosystems*

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 3 lands.

The Lowland Conifer landscape ecosystem occupies 217.7 acres of the Tract 3 – Wolf Lands 3 parcel. The Mesic Birch-Aspen-Spruce-Fir landscape ecosystem occupies 59.7 acres of the Tract 3 – Wolf Lands 3 parcel. Please see previous federal or non-federal lands sections above for a description of these landscape ecosystem types.

***Tract 3 – Wolf Lands 4***

*Habitat Types*

The primary MDNR GAP land cover type on the Tract 3 – Wolf Lands 4 parcel is lowland coniferous forest (see Table 4.3.4-18). The shrubland and mixed upland forest cover types are least represented. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-18 Tract 3 – Wolf Lands 4 Cover Types**

| Cover Types                                        | Total Acres  | Percent of Area |
|----------------------------------------------------|--------------|-----------------|
| Lowland coniferous forest <sup>1</sup>             | 356.5        | 88              |
| Upland coniferous forest <sup>3</sup>              | 32.0         | 8               |
| Upland deciduous forest <sup>4</sup>               | 8.2          | 2               |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 4.1          | 1               |
| Shrubland                                          | 3.9          | 1               |
| Aquatic environments                               | 0.0          | 0               |
| Cropland/grassland                                 | 0.0          | 0               |
| Disturbed                                          | 0.0          | 0               |
| Lowland deciduous forest <sup>2</sup>              | 0.0          | 0               |
| <b>Total</b>                                       | <b>404.7</b> | <b>100</b>      |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

**Plant Community Surveys**

The Tract 3 – Wolf Lands 4 parcel consists of approximately 90 percent wetland habitats (AECOM 2011c). Coyote Creek bisects the parcel and is bordered on either side by emergent wetland habitats similar to Tract 3 – Wolf Lands 3. Wetlands are dominated by pole black spruce in the northern half of the parcel and pole northern white cedar in the southern half. Scrub-shrub wetlands consist of speckled alder, leatherleaf, and bog-Labrador tea. See Section 4.3.3 for a more detailed description of wetland habitat types present.

Upland habitats consist of immature paper birch and black spruce, with balsam fir, beaked hazel, and raspberry also present. In areas that have been logged recently, sapling trembling aspen and paper birch are common over a shrub layer of beaked hazel, raspberry, and bog Labrador-tea (AECOM 2011c).

The majority of the black spruce/northern white cedar wetlands are dominated by trees ranging from 4 to 8 inches dbh (AECOM 2011c). Upland mature coniferous and deciduous trees range up to 18 inches dbh, although a 30-inch-dbh jack pine and several red pines up to 24 inches dbh have been found.

**Minnesota Biological Survey**

There are no designated MBS Sites of Biodiversity Significance located on the Tract 3 – Wolf Lands 4 parcel (see Figure 4.3.4-2) (MDNR 2008a). However, Tract 3 – Wolf Lands 4 is located on a potential MBS Site of Moderate to High Biodiversity Significance that has not yet been finalized by the MDNR (MDNR 2007a).

Native plant community rankings for Tract 3 are not available.

**Scientific and Natural Areas**

There are no SNAs located on the Tract 3 parcels.

### Culturally Important Plants

A discussion of natural resources culturally important to the Bands is presented in Section 4.2.9.3.3.

### Management Areas

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

### Ecological Land Types

Tract 3 – Wolf Lands 4 contains four categories of ELTs, including Lowland Loamy Moist (ELT 1), Lowland Loamy Wet (ELT 2), Lowland Organic Acid to Neutral (ELT 6), and Upland Deep Medium Loamy Dry (ELT 14). The entire Tract 3 – Wolf Lands 4 parcel is included in the Greenwood Lake Till Plain LTA.

### Management Indicator Habitats

Table 4.3.4-3 provides a summary of the MIH types and age classes present on Tract 3 lands (see Figure 4.3.4-2) (USFS 2010b). Though not considered an MIH, the Tract 3 – Wolf Lands 4 parcel also contains 31.0 acres of lowland shrub habitat.

### Landscape Ecosystems

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 3 lands.

The Lowland Conifer landscape ecosystem occupies 356.7 acres of the Tract 3 – Wolf Lands 4 parcel. The Mesic Birch-Aspen-Spruce-Fir landscape ecosystem occupies 47.9 acres of the Tract 3 – Wolf Lands 4 parcel. Please see previous federal or non-federal lands sections above for a description of these landscape ecosystem types.

### **Invasive Non-native Plants**

According to the Superior National Forest invasive plant geodatabase, there are no known occurrences of invasive species on any of the Tract 3 parcels (USFS 2010a). Field studies indicate that one area of Tract 3 – Wolf Lands 3 contains an occurrence of thistles and ox-eye daisy in a recently clear-cut habitat (AECOM 2011c).

### **Threatened and Endangered Plant Species**

#### Endangered, Threatened, and Special Concern Plant Species

Based on a review of the MDNR NHIS and field investigations, no federally or state-listed ETSC plant species are known to occur on the Tract 3 – Wolf Lands.

#### Regional Foresters Sensitive Species

There is more lowland black spruce-tamarack forest (MIH 9) and upland forest (MIH 1) habitat available than any other type, so the RFSS plants associated with these types would be most likely to occur on the Tract 3 lands. There is a very small amount of upland conifer forest (MIH 5) or aquatic habitats (MIH 14) so RFSS plants associated with these would be less likely to occur.

#### 4.3.4.2.8 Tract 4 – Hunting Club Lands

Tract 4 is 160.2 acres in size, located on the LaCroix Ranger District, 5 miles southwest of Crane Lake. Tract 4 is surrounded by the Superior National Forest, St. Louis County lands, and privately owned lands (USFS 2011n).

##### **Cover Types**

Tract 4 is located in the Laurentian Mixed Forest Province Ecoregion and in the Border Lakes subsection of the Laurentian Mixed Forest Province ecoregion (MDNR 2006a). Most of the vegetative cover types in this subsection grow in thin, acid, cobbly to gravelly glacial materials over Precambrian bedrock (MDNR 2011g). Lakes and rocky ridges dominate this type of landscape. Soils vary from coarse-loamy to coarse texture, and support forest communities of aspen-birch, aspen-birch-conifer, and, on dry sites, jack pine barrens. Many such communities within this subsection are fire-dependent.

##### ***Habitat Types***

The primary MDNR GAP land cover type on Tract 4 is upland deciduous forest (see Table 4.3.4-19). The upland conifer forest and lowland deciduous forest types are least represented. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-19 Tract 4 – Hunting Club Lands Cover Types**

| Cover Types                                        | Total Acres                | Percent of Area |
|----------------------------------------------------|----------------------------|-----------------|
| Upland deciduous forest <sup>4</sup>               | 84.6                       | 53              |
| Shrubland                                          | 45.0                       | 28              |
| Aquatic environments                               | 9.6                        | 6               |
| Lowland coniferous forest <sup>1</sup>             | 8.9                        | 6               |
| Upland coniferous forest <sup>3</sup>              | 8.2                        | 5               |
| Lowland deciduous forest <sup>2</sup>              | 4.0                        | 2               |
| Cropland/grassland                                 | 0.0                        | 0               |
| Disturbed                                          | 0.0                        | 0               |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 0.0                        | 0               |
| <b>Total</b>                                       | <b>160.3<sup>(6)</sup></b> | <b>100</b>      |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

<sup>6</sup> Total acres may be more or less than presented due to rounding.

##### ***Plant Community Surveys***

The primary cover types on Tract 4 are pole and mature deciduous forests on the uplands and scrub-shrub and emergent wetlands (AECOM 2011c). An unnamed creek bisects the parcel, and beaver ponds and dams are common wetland features. Emergent vegetation surrounding open

water consists of Canada bluejoint, narrow-leaved cattail, and sedges, while speckled alder dominates scrub-shrub wetlands. Pole black spruce and scattered tamarack dominate the wetlands on the interior of the parcel. Please see Section 4.3.3 for a more detailed description of wetland habitat types present.

Upland habitats in the northwestern, northeastern, and southern portions of the parcel are dominated by mature white pine, red pine, paper birch, and trembling aspen, with balsam fir and beaked hazel also present, though some areas consist of sapling and immature trees. The upland habitats in the eastern and southern portions of the parcel consist of patches of sapling and pole trembling aspen, with beaked hazel, black spruce, and balsam fir. An “island” of immature white pine, trembling aspen, and black spruce exists within this patch of sapling trembling aspen (AECOM 2011c).

The Tract 4 uplands are dominated by mostly deciduous sapling trees from 0 to 4 inches dbh, but mature white pines up to 24 inches dbh, and paper birch and trembling aspen up to 12 inches dbh occupy a large area as well (AECOM 2011c). Other upland areas on the parcel contain trembling aspen and white pine up to 16 inches dbh, and black spruce up to 12 inches dbh. Wetlands are dominated by immature coniferous forest trees ranging from 5 to 12 inches dbh.

### ***Minnesota Biological Survey***

There are no lands designated as MBS Sites of Biodiversity Significance on Tract 4 (see Figure 4.3.4-2) (MDNR 2008a).

Native plant community rankings are not available for Tract 4.

### ***Scientific and Natural Areas***

There are no lands designated as SNAs on Tract 4.

### ***Culturally Important Plants***

A discussion of natural resources culturally important to the Bands is presented in Section 4.2.9.3.3.

### ***Management Areas***

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

### ***Ecological Land Types***

Tract 4 contains seven different categories of ELTs, including Lowland Clayey Moist (ELT 3), Lowland Clayey Wet (ELT 4), Lowland Organic Acid to Neutral (ELT 6), Upland Deep Clayey Dry (ELT 10), Upland Shallow Loamy Dry (ELT 16), Upland Very Shallow Loamy Droughty (ELT 17), and Upland Extremely Shallow Loamy Droughty (ELT 18). The entire Tract 4 is included in the Johnson Lake Bedrock Complex LTA.

### ***Management Indicator Habitats***

Table 4.3.4-3 provides a summary of the MIH types and age classes present on Tract 4 (see Figure 4.3.4-2) (USFS 2010b). Though not considered MIHs, Tract 4 also contains 26.6 acres of lowland shrub habitat and 4.2 acres of lowland emergent habitat.

### ***Landscape Ecosystems***

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 4.

The Dry-Mesic Red and White Pine landscape ecosystem occupies 93.7 acres of Tract 4. Please see previous federal or non-federal lands sections above for a description of this landscape ecosystem type.

The Lowland Hardwood landscape ecosystem occupies 66.5 acres of Tract 4. It is dominated by black ash and/or balsam poplar, although elm, green ash, paper birch, aspen, yellow birch, balsam fir, northern white cedar, and white spruce may also be present (USFS 2004a). This landscape ecosystem typically occurs on sites that are seasonally wet or wet year-round. Stand replacement disturbances are infrequent, resulting in a multi-aged stand of black ash and balsam poplar.

### **Invasive Non-native Plants**

According to the Superior National Forest invasive plant geodatabase, there are no known occurrences of invasive species on Tract 4 (USFS 2010a).

### **Threatened and Endangered Plant Species**

#### ***Endangered, Threatened, and Special Concern Plant Species***

Based on a review of the MDNR NHIS and field investigations, no federally or state-listed ETSC plant species are known to occur on Tract 4.

### ***Regional Foresters Sensitive Species***

There is more upland forest (MIH 1) habitat available than any other type, so the RFSS plants associated with this type would be most likely to occur on Tract 4. There is a similar smaller amount of upland conifer forest (MIH 5), lowland black spruce-tamarack forest (MIH 9), and aquatic habitats (MIH 14), so RFSS plants associated with these would be less likely to occur.

### **4.3.4.2.9 Tract 5 – McFarland Lake Lands**

Tract 5 is 30.8 acres in size on the Gunflint Ranger District in northeastern Cook County. The tract adds to Superior National Forest ownership and includes lakefront property on McFarland Lake, which is an entry point to the BWCAW. The parcel reaches an approximate maximum elevation of 1,762 ft amsl and the topography slopes steeply to the east toward its eastern border of McFarland Lake (NTS 2010b).

### **Cover Types**

Tract 5 is located in the Border Lakes subsection of the Laurentian Mixed Forest Province ecoregion (MDNR 2006a). See Tract 4 above for a description of the Border Lakes subsection.

### Habitat Types

The primary MDNR GAP land cover type on Tract 5 is upland deciduous forest (see Table 4.3.4-20). The remaining cover types on the parcel are upland conifer forest and aquatic environments. The MDNR GAP land cover types below may not fully represent the extent of mixed forest types, since the cover type level below is fairly specific, so there may be more mixed forest types than indicated.

**Table 4.3.4-20 Tract 5 – McFarland Lake Lands Cover Types**

| Cover Types                                        | Total Acres | Percent of Area |
|----------------------------------------------------|-------------|-----------------|
| Upland deciduous forest <sup>4</sup>               | 26.6        | 86              |
| Upland coniferous forest <sup>3</sup>              | 4.0         | 13              |
| Aquatic environments                               | 0.2         | 1               |
| Cropland/grassland                                 | 0.0         | 0               |
| Disturbed                                          | 0.0         | 0               |
| Lowland coniferous forest <sup>1</sup>             | 0.0         | 0               |
| Lowland deciduous forest <sup>2</sup>              | 0.0         | 0               |
| Shrubland                                          | 0.0         | 0               |
| Upland conifer-deciduous mixed forest <sup>5</sup> | 0.0         | 0               |
| <b>Total</b>                                       | <b>30.8</b> | <b>100</b>      |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Includes lowland black spruce, lowland northern white cedar, and tamarack forest cover types.

<sup>2</sup> Includes black ash forest cover types.

<sup>3</sup> Includes pine and spruce/fir forest cover types.

<sup>4</sup> Includes aspen/aspen-white birch, maple/basswood, and oak forest cover types.

<sup>5</sup> Includes all mixed coniferous-deciduous forest cover types.

### Plant Community Surveys

Tract 5 consists of upland habitats, dominated by pole and mature deciduous and coniferous forests (AECOM 2009b; AECOM 2011b). The parcel is located on McFarland Lake, and a narrow band of horsetail and white cedar was observed along the shoreline (AECOM 2011b). Section 4.3.3 presents a more detailed description of wetland habitat types present.

Upland forest types on the hill slope of the parcel consist of trembling aspen, paper birch, mountain maple, northern white cedar, black spruce, and balsam fir. Mountain maple and northern white cedar are common on the lower hill slopes, while red pine and trembling aspen are more prevalent at the top of the hill slope. The shrub layer includes smooth sumac (*Rhus glabra*) and beaked hazel, while the ground layer includes forbs such as bunchberry, twining honeysuckle, clintonia, large-leaved aster, twinflower, false lily-of-the-valley (*Maianthemum canadense*), ox-eye daisy, thimbleberry (*Rubus parviflorus*), wild raspberry, wild strawberry, bog rosemary (*Andromeda glaucophylla*), bog cranberry (*Vaccinium oxycoccus*), wild sarsaparilla (*Aralia nudicaulis*), bracken fern and other ferns, and club moss (*Lycopodium spp.*) (AECOM 2011b). Some recent logging has occurred along the hill slope of the western boundary of the parcel. Steep rocky cliffs about 150 ft in height exist toward this western boundary (AECOM 2011b). Enchanter's nightshade (*Circaeae quadrifolata*) and wild columbine (*Aquilegia canadensis*) have been observed on the rocky cliffs.

Upland forests on the parcel contain trembling aspen, red pine, and eastern white pine up to 18 inches dbh, balsam fir up to 16 inches dbh, and paper birch up to 12 inches dbh (AECOM 2011b). Wetland forests along McFarland Lake contain northern white cedar up to 24 inches dbh.

### ***Minnesota Biological Survey***

There are no lands designated as MBS Sites of Biodiversity Significance on the Tract 5 lands (see Figure 4.3.4-2) (MDNR 2008a).

Native plant community rankings are not available for the Tract 5 lands.

### ***Scientific and Natural Areas***

There are no lands designated as SNAs on the Tract 5 lands.

### ***Culturally Important Plants***

A discussion of natural resources culturally important to the Bands is presented in Section 4.2.9.3.3.

### ***Management Areas***

The non-federal lands currently do not have any management area designations, as they are not managed by the federal government. Section 4.3.1 describes the management areas in detail.

### ***Ecological Land Types***

Tract 5 contains four different categories of ELTs, including Lowland Loamy Wet (ELT 2), Upland Deep Medium Loamy Dry (ELT 14), Upland Shallow Loamy Dry (ELT 16), and Upland Extremely Shallow Loamy Droughty (ELT 18), though categories are not available for the entire parcel. All of Tract 5 is included in the Rove Slate Bedrock Complex LTA.

### ***Management Indicator Habitats***

Table 4.3.4-3 provides a summary of the MIH types and age classes present on Tract 5 (see Figure 4.3.4-2) (USFS 2010b).

### ***Landscape Ecosystems***

Table 4.3.4-4 provides a summary of the landscape ecosystem types present on Tract 5.

The Mesic Red and White Pine landscape ecosystem occupies 30.8 acres of the Tract 5. See the federal or non-federal lands sections above for a description of these landscape ecosystem types.

### ***Invasive Non-native Plants***

According to the Superior National Forest invasive plant geodatabase, there are no known occurrences of invasive species on the Tract 5 lands (USFS 2010a).

### **Threatened and Endangered Plant Species**

#### ***Endangered, Threatened, and Special Concern Plant Species***

No federally listed ETSC plant species are known to occur on Tract 5. Based on a review of the MDNR NHIS, one state-listed threatened species and one species of special concern have been identified on Tract 5 (see Table 4.3.4-21 and Figure 4.3.4-3). Encrusted saxifrage is also tracked by the USFS as an RFSS. No other state-listed species are known to occur on Tract 5.

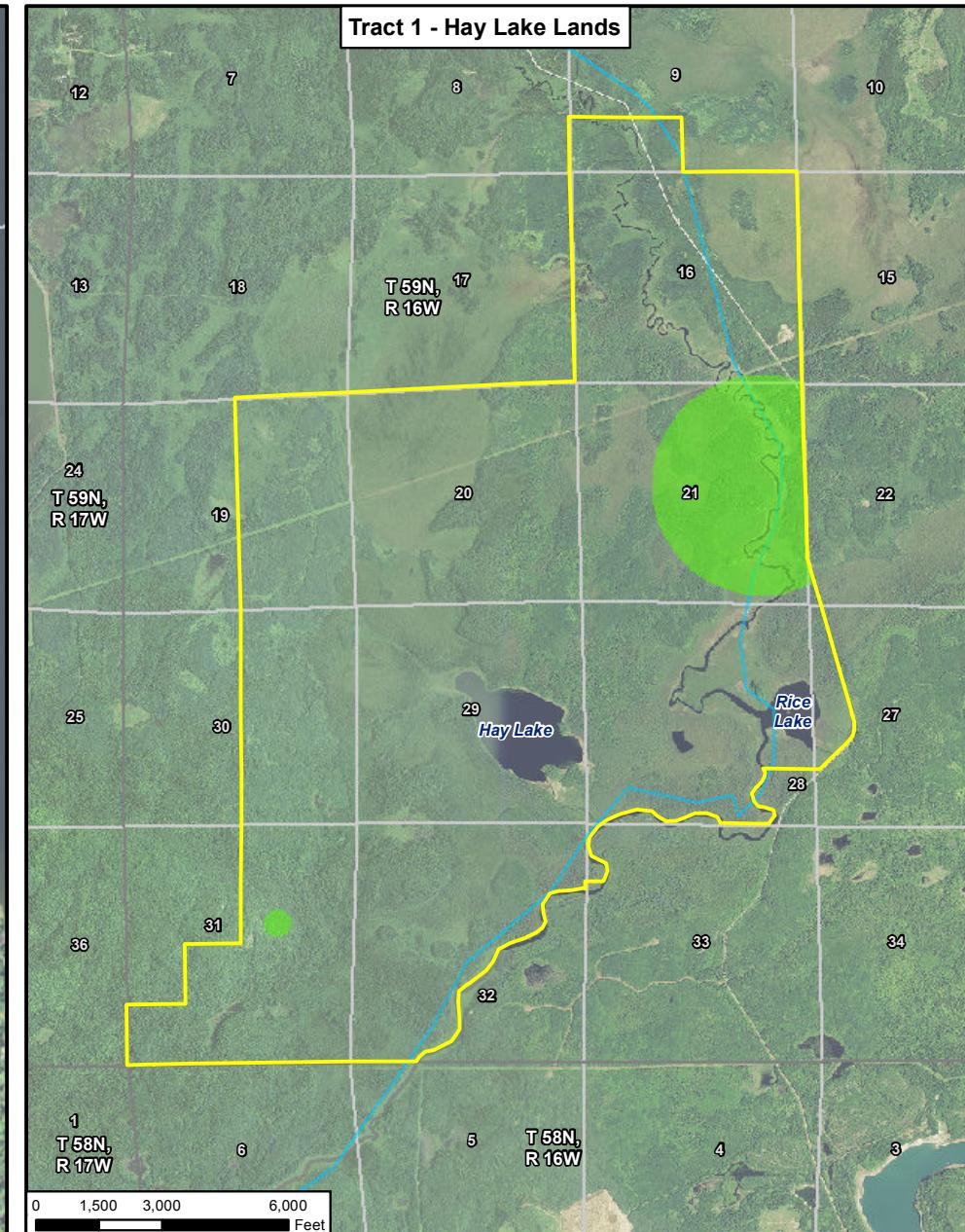
Rulemaking was conducted with the intent to update the list of ETSC species (*Minnesota Rules*, parts 6134.0100 to 6134.0400), with new listings becoming effective on August 19, 2013 (MDNR 2013h). This FEIS considers any new listings, or changes in the previous listings, associated with the updated list.

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[Yellow box] Non-federal Lands  
[Green box] Endangered, Threatened and Special Concern Vegetation Species  
**1** - Section Number

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**Figure 4.3.4-3**  
**ETSC Vegetation - Tracts 1 and 5**  
NorthMet Mining Project and Land Exchange FEIS  
Minnesota

November 2015

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**Table 4.3.4-21 Endangered, Threatened, and Special Concern Plant Species Identified on the Tract 5 Lands<sup>4</sup>**

| Common Name                      | Scientific Name                       | State Status <sup>1</sup> | No. of Populations | No. of Individuals <sup>2</sup> | Habitat and Location                                                           |
|----------------------------------|---------------------------------------|---------------------------|--------------------|---------------------------------|--------------------------------------------------------------------------------|
| Encrusted saxifrage <sup>3</sup> | <i>Saxifraga paniculata</i> (=aizoon) | SC                        | 1                  | 1000+                           | Shaded rock crevices and mossy ledges of north-facing sedimentary rock cliffs. |
| Rocky Mountain woodsia           | <i>Woodsia scopulina</i>              | T                         | 1                  | 2+                              | Cool, moist moss-covered chutes of north-facing sedimentary rock cliffs.       |

Sources: MDNR 2014d; MDNR 2011k.

Notes:

<sup>1</sup> E - Endangered, T - Threatened, SC - Species of Special Concern.

<sup>2</sup> Where the number of individuals cannot be determined without damaging the population, then patch size is used as a representative abundance measure.

<sup>3</sup> These species are also RFSS as tracked by the USFS.

<sup>4</sup> Data included here were provided by the Division of Ecological Resources, MDNR, and were current as of August 5, 2014. These data are not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are present.

#### Species Life Histories

The following summary provides descriptions of the life histories, state-wide distributions, and sensitivity to disturbance for each of the two threatened species found on Tract 5.

Encrusted saxifrage (*Saxifraga paniculata*) (synonyms: *Saxifraga aizoon* var. *neogaea*, white mountain saxifrage) is listed as a species of special concern in Minnesota and as an RFSS in the Superior National Forest. The species was first documented in Cook County, Minnesota in 1932, and has since only been reported in Cook and Lake counties (Bell Museum of Natural History 2011).

*S. paniculata* is an arctic-alpine species that reaches the southern end of its range in Minnesota (MDNR 2011k). It typically occurs in rock crevices and on ledges of shaded north-facing cliffs with bedrock of diabase, gabbro/diorite, basalt, or Rove Formation rocks. *S. paniculata* is a perennial herb species that flowers from early June to July and bears fruit from late July through August, though it can also spread vegetatively via stolons. There is very little suitable cliff habitat for *S. paniculata* in Minnesota, and threats to the species could include climate change, changes in the biotic community, and recreational exploration of vulnerable cliff faces.

Rocky Mountain woodsia (*Woodsia scopulina*) (Synonyms: *Woodsia scopulina* ssp. *laurentiana*) is listed as a threatened species in Minnesota; it is not listed as an RFSS in the Superior National Forest. The species was first documented in Cook County, Minnesota in 1929 amidst slate rocks, and has since only been reported in Cook County (Bell Museum of Natural History 2011). Though it is common in the Rocky Mountains, it is limited primarily to cool, moist north-facing cliffs of the Rove Slate Formation in northeast Minnesota (MDNR 2011k). *W. scopulina* is a perennial fern that grows in small clumps, and produces spores from summer to fall (eFlora 2011). There is very little suitable cliff habitat for *W. scopulina* in Minnesota, as it requires diabase and slate bedrock and east-west oriented valleys. Threats to the species could include climate change, introduction of non-native species, erosion events, forest management activities that alter the biotic community, or recreational exploration of vulnerable cliff faces.

### ***Regional Foresters Sensitive Species***

Based on a review of the MDNR NHIS, *Saxifraga paniculata* is located on Tract 5, and it is also an RFSS plant. There is more upland forest (MIH 1) habitat available than any other type, so the RFSS plants associated with this type would be most likely to occur on the Tract 5 lands. There is a smaller amount of upland conifer forest (MIH 5) and aquatic habitats (MIH 14) so RFSS plants associated with these would be less likely to occur. There is no lowland black spruce-tamarack forest (MIH 9) available, and so RFSS plants associated with this habitat would likely not exist. The cliff habitat present on Tract 5 is important to the 12 RFSS plants that utilize exposed rock habitats in the Superior National Forest (see Table 4.2.4-5), including *Saxifraga paniculata*, as there is very little suitable cliff microhabitat for these species in Minnesota. *Woodsia scopulina* also utilizes this habitat type.

### **4.3.5 Wildlife**

Rulemaking was conducted with the intent to update the list of ETSC species (*Minnesota Rules*, parts 6134.0100 to 6134.0400), with new listings becoming effective on August 19, 2013 (MDNR 2013h). This FEIS considers any new listings, or changes in the previous listings, associated with the updated list. A BA that provides further information on federally listed species, and a BE that contains further information about RFSS have been prepared. The BA and BE are included in Appendix D.

#### **4.3.5.1 Federal Lands**

##### **4.3.5.1.1 Land Exchange Proposed Action**

The federal land portion of the Land Exchange Proposed Action is similar to the Mine Site previously discussed, but extends further north and west and excludes the privately owned land bordering Dunka Road to the south of the Mine Site. Section 4.2.5.1 provides further discussion of the existing conditions on the Mine Site and associated federal lands.

The acres of key habitat present on the federal lands, along with the associated SGCN (and RFSS), are included in Table 4.3.5-1 below (see Figure 4.2.4-4).

**Table 4.3.5-1 Key Habitat, Cover Types, and Associated Species for the Federal Lands under the Land Exchange Proposed Action and Land Exchange Alternative B**

| Key Habitat Type, Cover Types, and Management Indicator Habitats                                                                                        | Associated Wildlife Species <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                           | Land Exchange Proposed Action (Acres) | Land Exchange Alternative B (Acres) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------|
| 1. Mature Upland Forest, Continuous<br>Upland/Lowland Forest: aspen forest/aspen-birch forest, jack pine forest, mixed pine-hardwood forest (MIHs 1-13) | Rock vole, <i>northern goshawk</i> , veery, whip-poor-will, eastern wood-peewee, yellow-bellied sapsucker, ovenbird, Canada warbler, spruce grouse, Cape May warbler, winter wren, boreal chickadee, <i>boreal owl</i> , wood thrush, black-backed woodpecker, <i>bald eagle</i> , black-throated blue warbler, <i>bay-breasted warbler</i> , <i>great gray owl</i> , <i>three-toed woodpecker</i> | 5,719.7                               | 4,258.1                             |
| 2. Open Ground, Bare Soils: disturbed/ developed (no MIH)                                                                                               | Laurentian tiger beetle                                                                                                                                                                                                                                                                                                                                                                            | 63.8                                  | 29.1                                |
| 3. Grassland and Brushland, Early Successional Forest (no MIH)                                                                                          | Franklin's ground squirrel, American badger, Le Conte's sparrow, eastern meadowlark, brown thrasher, white-throated sparrow, sharp-tailed grouse, golden-winged warbler, American woodcock, northern harrier, sedge wren, common nighthawk, black-billed cuckoo, bobolink, tawny crescent                                                                                                          | 651.8                                 | 439.1                               |
| 4. Aquatic Environments: rivers, lakes, ponds, wetlands, etc. (MIH 14)                                                                                  | American black duck, American bittern, swamp sparrow, common loon, northern rough-winged swallow, semipalmated sandpiper, American golden-plover, greater yellowlegs, buff-breasted sandpiper, eastern red-backed salamander, common snapping turtle, bog copper, <i>taiga alpine</i>                                                                                                              | 60.1                                  | 26.3                                |

| Key Habitat Type, Cover Types, and Management Indicator Habitats | Associated Wildlife Species <sup>1</sup>                                                                                                                                                                                                                                                                                         | Land Exchange Proposed Action (Acres) | Land Exchange Alternative B (Acres) |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------|
| 5. Multiple Habitats (MIHs 1-14)                                 | Gray wolf <sup>2</sup> (1-4 <sup>(3)</sup> ), <i>Canada lynx</i> <sup>2</sup> (1-4), rose-breasted grosbeak (1, 3), Macoun's arctic (1, 3), least flycatcher (1, 3), <i>Connecticut warbler</i> (1, 3), <i>olive-sided flycatcher</i> (1, 4), grizzled skipper (2, 3), Nabokov's blue (2, 4), wood turtle <sup>2</sup> (1, 3, 4) | NA                                    | NA                                  |
| <b>Total</b>                                                     |                                                                                                                                                                                                                                                                                                                                  | 6,495.4                               | 4,752.6                             |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Plain text indicates SGCN species; italicized text indicates RFSS; plain text indicates SGCN species identified as likely to be present at the Mine Site or Plant Site but not targeted in surveys.

<sup>2</sup> Canada lynx, gray wolf, bald eagle, and wood turtle are or have recently been listed as ETSC species as discussed in detail in the ETSC species section.

<sup>3</sup> Numbers refer to the Key Habitat Types (1-4) where those species may occur or are known to occur.

#### 4.3.5.1.2 Land Exchange Alternative B

As shown on Table 4.3.5-1, each of the key habitat types and MIH categories that are found on the federal lands of the Land Exchange Proposed Action are also found on the smaller federal parcel of the Land Exchange Alternative B. Acreages of each habitat category are correspondingly reduced for the Land Exchange Alternative B.

#### 4.3.5.2 Non-federal Lands

##### 4.3.5.2.1 Tract 1 – Hay Lake Lands

###### ***Federally and State-listed Species and Species of Special Concern***

Tract 1 is not located in an LAU but is located in designated lynx critical habitat. No Canada lynx or their sign have been observed on the non-federal lands during surveys (AECOM 2011b; AECOM 2011c). The Tract 1 parcel is located in Wolf Zone 2 and the Minnesota Northeast Wolf Zone. Radio-collared wolves have been recorded in the vicinity and evidence of wolves was observed during 2009 wildlife surveys (AECOM 2009b). Moose sign, including droppings, tracks, and browsing evidence, were observed on the Tract 1 lands in speckled alder and shrub wetlands (AECOM 2011b). Trumpeter swans, state-listed as species of special concern, were identified on the Tract 1 lands during wildlife surveys (AECOM 2011b) and habitat for the Laurentian tiger beetle, state-listed as a species of special concern, is present at the former sand and gravel pit on the parcel. An active northern goshawk territory is present on Tract 1, and is currently being monitored by the MDNR. Though northern goshawks were not seen or heard during 2011 field surveys (AECOM 2011b), NHIS records indicate one chick was observed on a new nest in 2013. There was a probable nesting attempt in 2014, as a nest was being incubated at one time but failed to produce chicks (USFS, Pers. Comm., August 21, 2015). Bats were recorded at several echolocation survey sites on or near the Tract 1 lands, but the species of the bats recorded was not determined (AECOM 2011b). Both NHIS records and surveys of the parcel failed to identify individuals or signs of the remaining federally and state-listed species and species of special concern, including wood turtle, horned grebe, Wilson's phalarope,

common tern, boreal owl, American white pelican, marbled godwit, yellow rail, smoky shrew, eastern heather vole, least weasel, and mountain lion (AECOM 2011b).

***Species of Greatest Conservation Need***

As discussed in Section 4.2.5.1.2, the potential presence of SGCN can be correlated to the presence of their corresponding habitat. Table 4.3.5-2 below lists the SGCN (and RFSS) by the key habitat types and cover types present in the Nashwauk Uplands ecological subsection.

Tract 1 is located in the Nashwauk Uplands ecological subsection. The species found in this subsection are listed in Table 4.3.5-2 below.

**Table 4.3.5-2 Key Habitat and Cover Types of Species of Greatest Conservation Need and Regional Forester Sensitive Species for Tract 1 in the Nashwauk Ecological Subsection**

| Key Habitat Type, Cover Types, and Management Indicator Habitats                                                                                        | Associated Wildlife Species <sup>1</sup>                                                                                                                                                                                                                                                                                                                                          | Tract 1 (Acres) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1. Mature Upland Forest, Continuous<br>Upland/Lowland Forest: aspen forest/aspen-birch forest, jack pine forest, mixed pine-hardwood forest (MIHs 1-13) | <i>Northern goshawk, veery, whip-poor-will, eastern wood-peewee, yellow-bellied sapsucker, ovenbird, Canada warbler, spruce grouse, Cape May warbler, winter wren, boreal chickadee, wood thrush, black-backed woodpecker, bald eagle, great gray owl, three-toed woodpecker</i>                                                                                                  | 2,978.8         |
| 2. Open Ground, Bare Soils: disturbed/developed (no MIH)                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                   | 0.0             |
| 3. Grassland and Brushland, Early Successional Forest (no MIH)                                                                                          | Franklin's ground squirrel, American badger, Le Conte's sparrow, eastern meadowlark, brown thrasher, white-throated sparrow, sharp-tailed grouse, golden-winged warbler, American woodcock, northern harrier, sedge wren, common nighthawk, black-billed cuckoo, red-headed woodpecker, bobolink, tawny crescent                                                                  | 1,696.3         |
| 4. Aquatic Environments: rivers, lakes, ponds, wetlands, etc. (MIH 14)                                                                                  | American black duck, American bittern, swamp sparrow, common loon, red-necked grebe, northern rough-winged swallow, dunlin, semipalmated sandpiper, short-billed dowitcher, American golden-plover, Virginia rail, greater yellowlegs, buff-breasted sandpiper, eastern red-backed salamander, common snapping turtle, bog copper, <i>taiga alpine, ebony boghaunter</i>          | 251.1           |
| 5. Multiple Habitats (MIHs 1-14)                                                                                                                        | Gray wolf <sup>2</sup> (1-4 <sup>(3)</sup> ), Canada lynx <sup>2</sup> (1-4), <i>eastern pipistrelle</i> (1,3), rose-breasted grosbeak(1,3), least flycatcher (1,3), <i>olive-sided flycatcher</i> (1,4), <i>Connecticut warbler</i> (1,3), peregrine falcon(1-3), Macoun's arctic (1,3), <i>Nabokov's blue</i> (2,4), <i>grizzled skipper</i> (2,3), <i>Quebec emerald</i> (3,4) | NA              |
| <b>Total<sup>4</sup></b>                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                   | <b>4,926.2</b>  |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Plain text indicates SGCN species, italicized text indicates RFSS.

<sup>2</sup> Canada lynx, gray wolf, bald eagle, and wood turtle are or have recently been listed as ETSC species as discussed in detail in the ETSC species section.

<sup>3</sup> Numbers refer to the Key Habitat Types (1-4) where those species may occur or are known to occur.

<sup>4</sup> Total acres may be more or less than presented due to rounding.

### **Regional Forester Sensitive Species**

RFSS that are also state-listed or species of special concern are discussed above. With the possible exception of RFSS bat species, no other RFSS were observed during surveys of Tract 1 (AECOM 2011b). Potential Superior National Forest RFSS and their habitat on Tract 1 are listed on Table 4.3.5-2.

### **Other Wildlife Species**

Other wildlife species, including species of concern to the Bands, were observed during surveys of Tract 1. Species observed, or their sign, include black bear, white-tailed deer, red fox, river otter, beaver, marten, red squirrel, snowshoe hare, ruffed grouse, American woodcock, common loon, hooded merganser, ring-necked duck, red-tailed hawk, broad-winged hawk, barred owl, great horned owl, pileated woodpecker, several passerine bird species, snapping turtle, and painted turtle (AECOM 2011b).

Sections 4.2.5, 4.2.9, 5.2.5, and 5.2.9 discuss species of importance to the Bands.

#### **4.3.5.2.2 Tract 2 – Lake County Lands**

##### **Federally and State-listed Species and Species of Special Concern**

Tract 2 is split into two parcels, Lake County Lands North and Lake County Lands South. Lake County North is located in LAU 16 and Lake County South is located in LAU 22. Both are in designated lynx critical habitat. No Canada lynx or their sign have been observed on the non-federal lands during surveys (AECOM 2011b; AECOM 2011c). While no lynx or their sign have been observed on the Tract 2 parcels, denning habitat may be present. Areas of blowdown or logging slash where there is both vertical and horizontal cover may be used by lynx for denning sites (Moen 2009). Moose sign, including droppings, tracks, and browsing evidence, were observed on the Lake County South parcel in speckled alder and shrub wetlands (AECOM 2011c).

Both Tract 2 parcels are located in federal Wolf Zone 2 and the Minnesota Northeast Wolf Zone. Wolf sign was observed on Lake County North during 2010 wildlife surveys (AECOM 2011c). Both NHIS records and surveys of the parcel failed to identify individuals or signs of the remaining federally and state-listed species or species of special concern (MDNR 2014d; AECOM 2011c).

##### **Species of Greatest Conservation Need**

The Lake County North parcel is located in the Laurentian Uplands ecological subsection and the Lake County South parcel is located in the North Shore Highlands ecological subsection. Table 4.3.5-3 below lists the SGCN (and RFSS) by the key habitat types and cover types present at Tract 2.

**Table 4.3.5-3 Key Habitat and Cover Types of Species of Greatest Conservation Need and Regional Forester Sensitive Species for Tract 2 in the Laurentian Uplands and North Shore Highlands Ecological Subsections**

| Key Habitat Type, Cover Types, and Management Indicator Habitats                                                                                     | Associated Wildlife Species <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tract 2 (Acres) |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1. Mature Upland Forest, Continuous Upland/Lowland Forest: aspen forest/aspen-birch forest, jack pine forest, mixed pine-hardwood forest (MIHs 1-13) | Rock vole, <i>northern goshawk</i> , veery, whip-poor-will, eastern wood-peewee, yellow-bellied sapsucker, ovenbird, Canada warbler, spruce grouse, Cape May warbler, winter wren, boreal chickadee, <i>boreal owl</i> , wood thrush, black-backed woodpecker, <i>bald eagle</i> , black-throated blue warbler, <i>bay-breasted warbler</i> , <i>great gray owl</i> , <i>three-toed woodpecker</i>                                                                                                                                                                                 | 337.2           |
| 2. Open Ground, Bare Soils: disturbed/ developed (no MIH)                                                                                            | Laurentian tiger beetle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.0             |
| 3. Grassland and Brushland, Early Successional Forest (no MIH)                                                                                       | Franklin's ground squirrel, American badger, Le Conte's sparrow, eastern meadowlark, brown thrasher, white-throated sparrow, sharp-tailed grouse, golden-winged warbler, American woodcock, northern harrier, sedge wren, common nighthawk, black-billed cuckoo, bobolink, red-headed woodpecker, tawny crescent                                                                                                                                                                                                                                                                   | 38.9            |
| 4. Aquatic Environments: rivers, lakes, ponds, wetlands, etc. (MIH 14)                                                                               | American black duck, American bittern, swamp sparrow, common loon, northern rough-winged swallow, dunlin, semipalmated sandpiper, short-billed dowitcher, American golden-plover, Virginia rail, greater yellowlegs, buff-breasted sandpiper, ruddy turnstone, white-rumped sandpiper, marsh wren, Hudsonian godwit, whimbrel, common tern, eastern red-backed salamander, common snapping turtle, Blanding's turtle, bog copper, <i>taiga alpine</i> , extra-striped snaketail, <i>ebony boghaunter</i>                                                                           | 5.8             |
| 5. Multiple Habitats (MIHs 1-14)                                                                                                                     | Gray wolf <sup>2</sup> (1-4 <sup>(3)</sup> ), Canada lynx <sup>2</sup> (1-4), <i>eastern heather vole</i> (1,3), smoky shrew (1,3), <i>northern long-eared bat</i> (1,4), <i>eastern pipistrelle</i> (1,3,4), eastern spotted skunk (1,3), rose-breasted grosbeak (1,3), least flycatcher (1,3), <i>olive-sided flycatcher</i> (1,4), <i>Connecticut warbler</i> (1,3), peregrine falcon(1-3), <i>wood turtle</i> <sup>2</sup> (1,3,4), four-toed salamander (1,4), Macoun's arctic (1,3), <i>Nabokov's blue</i> (2,4), <i>grizzled skipper</i> (2,3), <i>Quebec emerald</i> (3,4) | NA              |
| <b>Total</b>                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 381.9           |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Plain text indicates SGCN species, italicized text indicates RFSS.

<sup>2</sup> Canada lynx, gray wolf, bald eagle, and wood turtle are or have recently been listed as ETSC species as discussed in detail in the ETSC species section.

<sup>3</sup> Numbers refer to the Key Habitat Types (1-4) where those species may occur or are known to occur.

### **Regional Forester Sensitive Species**

RFSS that are also state-listed or species of special concern are discussed above. No other RFSS were observed during surveys of Tract 2. Potential Superior National Forest RFSS and their habitat on Tract 2 are listed on Table 4.3.5-3.

### **Other Wildlife Species**

Other wildlife species, including species of concern to the Bands, were observed during surveys of Tract 2. Species observed, or their sign, include white-tailed deer, beaver, snowshoe hare, marten, mink, red squirrel, raven, ruffed grouse, pileated woodpecker, and several passerine bird species (AECOM 2011c).

Sections 4.2.5, 4.2.9, 5.2.5, and 5.2.9 discuss species of importance to the Bands.

#### **4.3.5.2.3 Tract 3 – Wolf Lands**

##### **Federally and State-listed Species and Species of Special Concern**

Tract 3 is split into four parcels, Wolf Lands 1, 2, 3, and 4. Wolf Lands 1 is located in LAU 16 and Wolf Lands 2 through 4 are located in LAU 22. All are within designated lynx critical habitat. No Canada lynx or their sign have been observed on the non-federal lands during surveys (AECOM 2011b; AECOM 2011c). While no lynx or their sign have been observed on the Tract 3 parcels, denning habitat may be present. Areas of blowdown or logging slash where there is both vertical and horizontal cover may be used by lynx for denning sites (Moen 2009). Moose sign, including droppings, tracks, and browsing evidence, were observed on the Wolf Lands 3 and 4 parcels in speckled alder and shrub wetlands (AECOM 2011c).

All Tract 3 parcels are located in federal Wolf Zone 2 and the Minnesota Northeast Wolf Zone. Wolf sign was observed on Wolf Lands 3 and 4 during 2010 wildlife surveys (AECOM 2011c). Both NHIS records and surveys of the parcel failed to identify individuals or signs of the remaining federally and state-listed species or species of special concern (MDNR 2014d; AECOM 2011c).

##### **Species of Greatest Conservation Need**

The Wolf Lands parcels are located in the Laurentian Uplands ecological subsection. The species of greatest conservation need and habitat that may be found in this subsection are listed on Table 4.3.5-4.

**Table 4.3.5-4 Key Habitat and Cover Types of Species of Greatest Conservation Need and Regional Forester Sensitive Species for Tract 3 in the Laurentian Uplands Ecological Subsection**

| Key Habitat Type, Cover Types, and Management Indicator                                                                                              | Associated Wildlife Species <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                     | Tract 3 (Acres) |
|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Habitats                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                              |                 |
| 1. Mature Upland Forest, Continuous Upland/Lowland Forest: aspen forest/aspen-birch forest, jack pine forest, mixed pine-hardwood forest (MIHs 1-13) | Rock vole, <i>northern goshawk</i> , veery, whip-poor-will, eastern wood-peewee, yellow-bellied sapsucker, ovenbird, Canada warbler, spruce grouse, Cape May warbler, winter wren, boreal chickadee, <i>boreal owl</i> , wood thrush, black-backed woodpecker, <i>bald eagle</i> , black-throated blue warbler, <i>bay-breasted warbler</i> , <i>great gray owl</i> , <i>three-toed woodpecker</i>           | 1,479.4         |
| 2. Open Ground, Bare Soils: disturbed/ developed (no MIH)                                                                                            | Laurentian tiger beetle                                                                                                                                                                                                                                                                                                                                                                                      | 0.0             |
| 3. Grassland and Brushland, Early Successional Forest (no MIH)                                                                                       | Franklin's ground squirrel, American badger, Le Conte's sparrow, eastern meadowlark, brown thrasher, white-throated sparrow, sharp-tailed grouse, golden-winged warbler, American woodcock, northern harrier, sedge wren, common nighthawk, black-billed cuckoo, bobolink, tawny crescent                                                                                                                    | 96.5            |
| 4. Aquatic Environments: rivers, lakes, ponds, wetlands, etc. (MIH 14)                                                                               | American black duck, American bittern, swamp sparrow, common loon, northern rough-winged swallow, semipalmated sandpiper, American golden-plover, greater yellowlegs, buff-breasted sandpiper, eastern red-backed salamander, common snapping turtle, bog copper, <i>taiga alpine</i> , <i>ebony boghaunter</i>                                                                                              | 0.0             |
| 5. Multiple Habitats (MIHs 1-14)                                                                                                                     | Gray wolf <sup>2</sup> (1-4 <sup>(3)</sup> ), Canada lynx <sup>2</sup> (1-4), <i>eastern heather vole</i> (1,3), smoky shrew (1,3), <i>eastern pipistrelle</i> (1,3,4), rose-breasted grosbeak (1,3), least flycatcher (1,3), <i>olive-sided flycatcher</i> (1,4), <i>Connecticut warbler</i> (1,3), Macoun's arctic (1,3), Nabokov's blue (2,4), <i>grizzled skipper</i> (2,3), <i>Quebec emerald</i> (3,4) | NA              |
| <b>Total<sup>4</sup></b>                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                              | <b>1,575.9</b>  |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Plain text indicates SGCN species, italicized text indicates RFSS.

<sup>2</sup> Canada lynx, gray wolf, and bald eagle are or have recently been listed as ETSC species as discussed in detail in the ETSC species section.

<sup>3</sup> Numbers refer to the Key Habitat Types (1-4) where those species may occur or are known to occur.

<sup>4</sup> Total acres may be more or less than presented due to rounding.

### **Regional Forester Sensitive Species**

RFSS that are also state-listed or species of special concern are discussed above. No other RFSS were observed during surveys of Tract 3. Potential Superior National Forest RFSS and their habitat on Tract 3 are listed on Table 4.3.5-4.

### ***Other Wildlife Species***

Other wildlife species, including species of concern to the Bands, were observed during surveys of Tract 3. Species observed, or their sign, include white-tailed deer, red fox, marten, snowshoe hare, beaver, red squirrel, ruffed grouse, pileated woodpecker, and several passerine bird species (AECOM 2011c).

Sections 4.2.5, 4.2.9, 5.2.5, and 5.2.9 discuss species of importance to the Bands.

#### **4.3.5.2.4 Tract 4 – Hunting Club Lands**

##### ***Federally and State-listed Species and Species of Special Concern***

Tract 4 is located in LAU 4 and is located in designated lynx critical habitat. No Canada lynx or their sign have been observed on the non-federal lands during surveys (AECOM 2011b; AECOM 2011c). The Tract 4 parcel is located in federal Wolf Zone 2 and the Minnesota Northeast Wolf Zone. Both NHIS records and surveys of the parcel failed to identify individuals or signs of federally and state-listed species or species of special concern (MDNR 2014d; AECOM 2011c).

##### ***Species of Greatest Conservation Need***

Tract 4 is located in the Border Lakes ecological subsection. Table 4.3.5-5 lists the species of greatest conservation need and habitat that may be found in this subsection.

**Table 4.3.5-5 Key Habitat and Cover Types of Species of Greatest Conservation Need and Regional Forester Sensitive Species for Tracts 4 and 5 in the Border Lakes Ecological Subsection**

| Key Habitat Type, Cover Types, and Management Indicator Habitats                                                                                     | Associated Wildlife Species <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                 | Tract 4 (Acres) | Tract 5 (Acres) |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|
| 1. Mature Upland Forest, Continuous Upland/Lowland Forest: aspen forest/aspen-birch forest, jack pine forest, mixed pine-hardwood forest (MIHs 1-13) | Rock vole, <i>northern goshawk</i> , veery, whip-poor-will, eastern wood-peewee, yellow-bellied sapsucker, ovenbird, Canada warbler, spruce grouse, Cape May warbler, winter wren, boreal chickadee, <i>boreal owl</i> , wood thrush, black-backed woodpecker, <i>bald eagle</i> , black-throated blue warbler, <i>bay-breasted warbler</i> , <i>great gray owl</i> , <i>three-toed woodpecker</i>                                       | 105.7           | 30.6            |
| 2. Open Ground, Bare Soils: disturbed/ developed (no MIH)                                                                                            | Laurentian tiger beetle                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0             | 0.0             |
| 3. Grassland and Brushland, Early Successional Forest (no MIH)                                                                                       | Le Conte's sparrow, eastern meadowlark, brown thrasher, white-throated sparrow, golden-winged warbler, American woodcock, northern harrier, sedge wren, common nighthawk, black-billed cuckoo, bobolink, tawny crescent                                                                                                                                                                                                                  | 45.0            | 0.0             |
| 4. Aquatic Environments: rivers, lakes, ponds, wetlands, etc. (MIH 14)                                                                               | American black duck, American bittern, swamp sparrow, common loon, northern rough-winged swallow, semipalmated sandpiper, American golden-plover, greater yellowlegs, buff-breasted sandpiper, ruddy turnstone, white-rumped sandpiper, black tern, red-necked grebe, eastern red-backed salamander, common snapping turtle, <i>taiga alpine</i> , <i>ebony boghaunter</i>                                                               | 9.6             | 0.2             |
| 5. Multiple Habitats (MIHs 1-14)                                                                                                                     | Gray wolf <sup>2</sup> (1-4 <sup>(3)</sup> ), Canada lynx <sup>2</sup> (1-4), <i>eastern heather vole</i> (1,3), smoky shrew (1,3), <i>eastern pipistrelle</i> (1,3), rose-breasted grosbeak (1,3), least flycatcher (1,3), <i>olive-sided flycatcher</i> (1,4), <i>Connecticut warbler</i> (1,3), rusty blackbird (1,4), Macoun's arctic (1,3), <i>Nabokov's blue</i> (2,4), <i>grizzled skipper</i> (2,3), <i>Quebec emerald</i> (3,4) | NA              | NA              |
| <b>Total<sup>4</sup></b>                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>160.3</b>    | <b>30.8</b>     |

Source: MDNR 2006b.

Notes:

<sup>1</sup> Plain text indicates SGCN species, italicized text indicates RFSS.

<sup>2</sup> Canada lynx, gray wolf, and bald eagle are or have recently been listed as ETSC species as discussed in detail in the ETSC species section.

<sup>3</sup> Numbers refer to the Key Habitat Types (1-4) where those species may occur or are known to occur.

<sup>4</sup> Total acres may be more or less than presented due to rounding.

### **Regional Forester Sensitive Species**

RFSS that are also state-listed or species of special concern are discussed above. No other RFSS were observed during surveys of Tract 4 (AECOM 2011c). Potential Superior National Forest RFSS and their habitat on Tract 4 are listed on Tables 4.3.5-5.

### **Other Wildlife Species**

Other wildlife species, including species of concern to the Bands, were observed during surveys of Tract 4. Species observed, or their sign, include white-tailed deer, red fox, marten, snowshoe hare, beaver, red squirrel, pileated woodpecker, and several passerine bird species (AECOM 2011c).

Sections 4.2.5, 4.2.9, 5.2.5, and 5.2.9 discuss species of importance to the Bands.

#### **4.3.5.2.5 Tract 5 – McFarland Lake Lands**

##### **Federally and State-listed Species and Species of Special Concern**

Tract 5 is located in LAU 42 and is located in designated lynx critical habitat. No Canada lynx or their sign have been observed on the non-federal lands during surveys (AECOM 2011b; AECOM 2011c). Though bats were observed on the parcel, the species of bats were not determined and may potentially include eastern pipistrelle and/or northern long-eared bat (AECOM 2011b). The Tract 5 parcel is located in federal Wolf Zone 2 and the Minnesota Northeast Wolf Zone. Wolf sign was observed on the parcel in October 2011. Both NHIS records and surveys of the parcel failed to identify individuals or signs of the remaining federally and state-listed species or species of special concern (MDNR 2014d; AECOM 2011c).

##### **Species of Greatest Conservation Need**

Like Tract 4, Tract 5 is located in the Border Lakes ecological subsection. Table 4.3.5-5 provides a list of species of greatest conservation need and habitat that may be found in this subsection.

##### **Regional Forester Sensitive Species**

RFSS that are also state-listed or species of special concern are discussed above. With the possible exception of RFSS bat species, no other RFSS were observed during surveys of Tract 5 (AECOM 2011b). Potential Superior National Forest RFSS and their habitat on Tract 5 are listed on Table 4.3.5-5.

##### **Other Wildlife Species**

Other wildlife species, including species of concern to the Bands, were observed during surveys of Tract 5. Species observed, or their sign, include black bear, white-tailed deer, red fox, beaver, red squirrel, raven, ruffed grouse, common loon, hooded merganser, broad-winged hawk, barred owl, pileated woodpecker, and several passerine bird species (AECOM 2011b).

Sections 4.2.5, 4.2.9, 5.2.5, and 5.2.9 discuss species of importance to the Bands.

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### **4.3.6 Aquatic Species**

This section discusses aquatic resources located on the non-federal parcels considered for acquisition by the USFS through the Land Exchange Proposed Action. The federal lands are discussed in Section 4.2.6.1 along with the Mine Site. The Alternative B: Smaller Federal Parcel contains similar surface waters, but smaller acreages or linear distances than the federal lands.

Some of the non-federal lands contain streams, creeks, rivers, and lakes. Tract 1 contains three lakes and one river, comprising approximately 90,000 linear ft of shoreline and approximately 129 acres of surface area. Tract 3 – Wolf Lands 3 and Wolf Lands 4 contain Coyote Creek, with approximately 12 linear ft of river frontage per acre. Tract 5 includes 506 ft of McFarland Lake frontage. Tract 2 and Tract 4 do not contain surface water features.

There are no SGCN, state, federal, or RFSS species known to occur at or in the immediate vicinity of the non-federal lands. According to available data, however, there are several SGCN or RFSS that are associated with the Superior National Forest or various ecoregions on which the non-federal lands are located.

Rulemaking was conducted with the intent to update the list of ETSC species (*Minnesota Rules*, parts 6134.0100 to 6134.0400), with new listings becoming effective on August 19, 2013 (MDNR 2013h). The FEIS considers any new listings, or changes in the previous listings, associated with the updated list. The FEIS also considers any federal listing changes. A BE has been prepared that contains further information about RFSS species. The BE is included in Appendix D.

#### **4.3.6.1 Federal Lands**

##### **4.3.6.1.1 Land Exchange Proposed Action**

The existing conditions found within the federal lands area are discussed in Section 4.2.6.1.

##### **4.3.6.1.2 Land Exchange Alternative B**

The existing conditions found within the Alternative B area are discussed in Section 4.2.6.1. However, site-specific information is presented below.

##### **Surface Water Features**

A portion of Mud Lake, covering 8.9 acres with approximately 1,200 ft of lake frontage, is located within the Alternative B lands. The length of lake frontage per acre of this alternative boundary is 0.3 ft.

As with the federal lands within the Land Exchange Proposed Action, Yelp Creek and the Partridge River, which originates at the Northshore Mine, flow out of the One Hundred Mile Swamp and through portions of the smaller federal parcel within the Land Exchange Alternative B. Collectively, the creek and river are 5.3 miles in length in the Alternative B, corresponding to 55,968 linear ft of creek/river frontage (counting both shores). The combined Yelp Creek and Partridge River frontage per acre of the smaller federal parcel within the Land Exchange Alternative B is 11.8 ft (see Table 4.3.6-1).

The MIH represented within the boundaries of the Alternative B: Smaller Federal Parcel includes 8.9 acres for Mud Lake and 55,968 linear ft for the combined Yelp Creek and Partridge River.

**Table 4.3.6-1 Alternative B Surface Water Characteristics**

| Surface Water   | Size on Parcel | Approximate Shoreline<br>Frontage (ft) | MIH                | Frontage Index<br>(ft/acre) |
|-----------------|----------------|----------------------------------------|--------------------|-----------------------------|
| Mud Lake        | 8.9 acres      | 1,200.0                                | 8.9 acres          | 0.3                         |
| Yelp Creek      | 1.1 miles      | *                                      | *                  | *                           |
| Partridge River | 4.2 miles      | 55,968.0                               | 55,968.0 linear ft | 11.8                        |

Source: Adapted from AECOM 2011d.

\* Combined with Partridge River.

### 4.3.6.2 Non-federal Lands

#### 4.3.6.2.1 Tract 1 – Hay Lake Lands

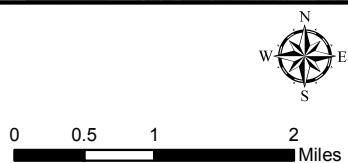
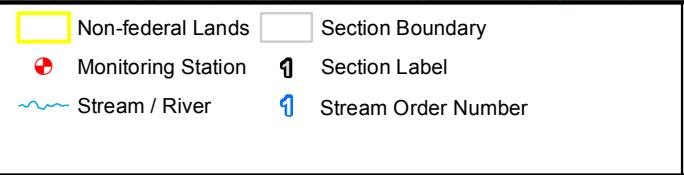
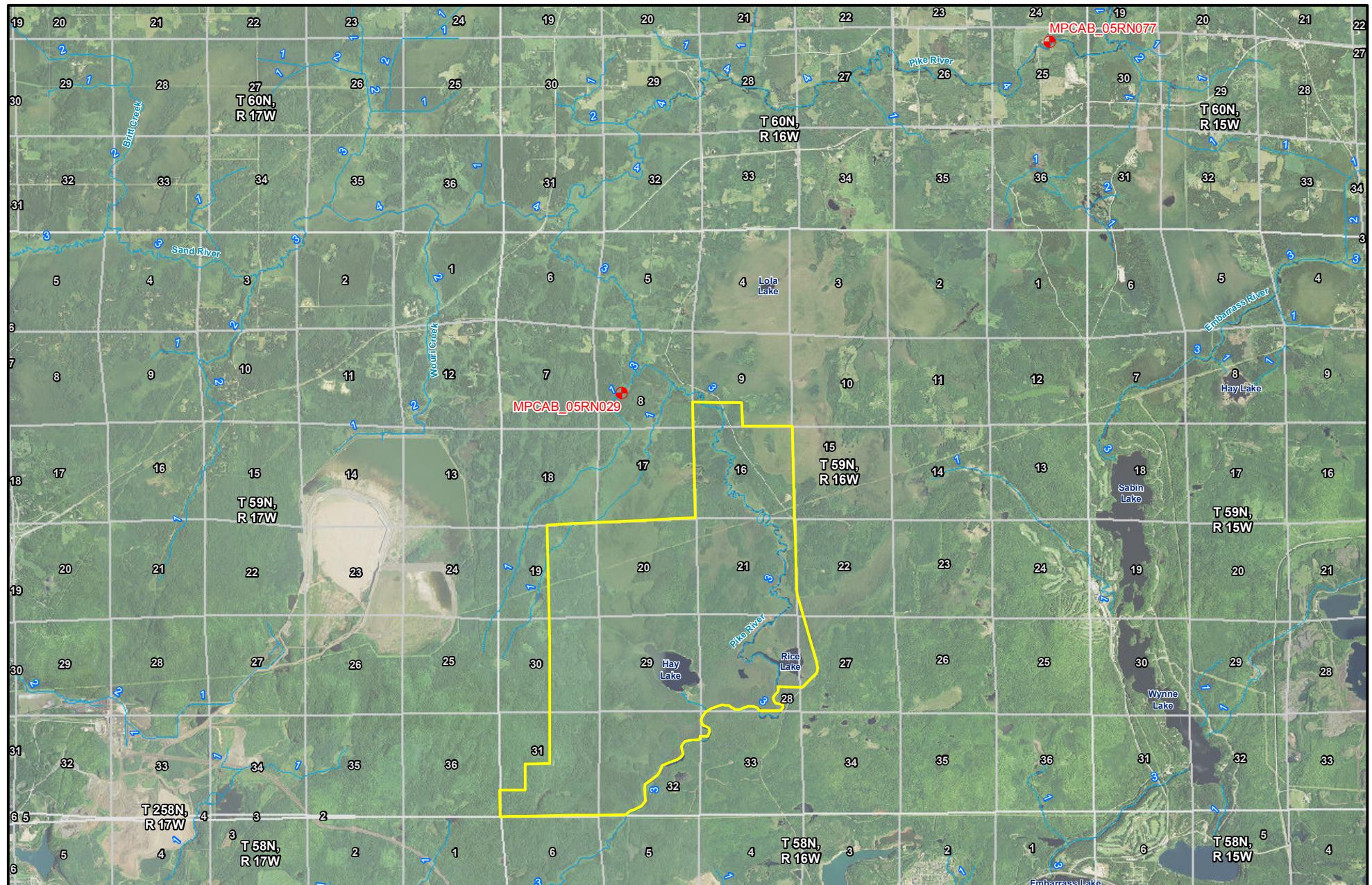
##### **Surface Water Features**

Surface water features on Tract 1 include three lakes and one river. Aerial photograph review of the three lakes associated with the parcel indicates a mix of deep water and shallow, submergent/emergent vegetation habitats in the open water portions of the lakes, which provide fish and macroinvertebrate habitats.

The Pike River, which flows north through the tract, is classified as a third-order stream (see Figure 4.3.6-1) within Tract 1 and includes approximately 376.2 acres of mapped floodplain. The heavily vegetated riparian habitats and associated floodplains adjacent to the river's edge likely provide important fish and macroinvertebrate habitats. Tract 1 also has unmapped floodplains associated with Hay Lake itself, which has been estimated to be approximately 175.0 acres.

The USFS MIH categories within Tract 1 include 129.6 acres of lakes, 16,424 linear ft of lake shoreline, and 72,864 linear ft of river shoreline (see Table 4.3.6-2).

Riparian habitats, which surround all surface water features on the parcel, include shrub-carr, coniferous swamp, sedge meadow, alder thicket, shallow open water, and deep marsh wetlands (AECOM 2011d). Aerial photograph review indicates a wide riparian buffer and minimal disturbance along each surface water feature. All wetlands adjacent to the surface water features scored high for fish habitat according to the MnRAM 3.2 rating (AECOM 2011d).



**Figure 4.3.6-1**  
**Monitoring Sample Site Locations**  
**Tract 1 - Hay Lake Lands**  
**NorthMet Mining Project and Land Exchange FEIS**  
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**Table 4.3.6-2 Tract 1 Surface Water Characteristics**

| Surface Water | Surface Area<br>(acres) | Approximate Shoreline Frontage<br>(linear ft) | MIH              |
|---------------|-------------------------|-----------------------------------------------|------------------|
| Hay Lake      | 96.2                    | 9,894.4                                       | 96.2 acres       |
| Rice Lake     | 29.5                    | 4,829.6                                       | 29.5 acres       |
| Unnamed lake  | 3.9                     | 1,700                                         | 3.9 acres        |
| Pike River    | na                      | 72,864 <sup>1</sup>                           | 72,864 linear ft |
| Total         | 129.6                   | 89,288                                        |                  |

Source: Adapted from AECOM 2011d.

Notes:

na = Not available

<sup>1</sup> Includes riparian distance on both sides of river except along property boundary to the southeast where only the west side of the river is included.

### **Aquatic Biota Studies**

No aquatic biota studies were performed within the surface water features associated with Tract 1; however, studies were completed by the MPCA (MPCA 2011c) for two locations downstream from the parcel's northern boundary (see Figure 4.3.6-1). Aquatic biota sampling station MPCAB\_05RN029 is located in a first-order section of an unnamed tributary to the Pike River approximately 1 river mile downstream from Tract 1's northern boundary. The sampling station MPCAB\_05RN077 is located approximately 12 river miles downstream of the parcel's northern boundary in a fourth-order section of the Pike River. These aquatic biota sampling stations recorded predominant stream substrate and fish assemblages at both locations and benthic macroinvertebrate assemblages at station MPCAB\_05RN029, as summarized in Table 4.3.6-3 and 4.3.6-4.

**Table 4.3.6-3 Fish Species Collected at the MPCA Sampling Sites in the Vicinity of the Tract 1 Parcel**

| Scientific Name                | Common Name       | Tolerance Designation <sup>1</sup> | Site                                    |                                         |
|--------------------------------|-------------------|------------------------------------|-----------------------------------------|-----------------------------------------|
|                                |                   |                                    | MPCAB_05RN029<br>(individuals recorded) | MPCAB_05RN077<br>(individuals recorded) |
| <i>Catostomus commersonii</i>  | White sucker      | Tolerant                           | 9                                       | 1                                       |
| <i>Notemigonus crysoleucas</i> | Golden shiner     | Tolerant                           |                                         | 3                                       |
| <i>Notropis hudsonius</i>      | Spottail shiner   | Intermediate                       |                                         | 6                                       |
| <i>Etheostoma nigrum</i>       | Johnny darter     | Intermediate                       |                                         | 19                                      |
| <i>Lota lota</i>               | Burbot            | Intermediate                       |                                         | 12                                      |
| <i>Ambloplites rupestris</i>   | Rock bass         | Intermediate                       |                                         | 1                                       |
| <i>Esox lucius</i>             | Northern pike     | Intermediate                       |                                         | 2                                       |
| <i>Culaea inconstans</i>       | Brook stickleback | Intermediate                       | 8                                       |                                         |
| <i>Umbra limi</i>              | Central mudminnow | Tolerant                           | 7                                       | 43                                      |
| <i>Phoxinus neogaeus</i>       | Finescale dace    | Intermediate                       | 1                                       |                                         |
| <i>Semotilus atromaculatus</i> | Creek chub        | Tolerant                           | 3                                       | 2                                       |
| Study year                     |                   |                                    | 2005                                    | 2009                                    |
| Species observed               |                   |                                    | 5                                       | 9                                       |
| # intolerant species           |                   |                                    | 0                                       | 0                                       |

| Scientific Name                                  | Common Name | Tolerance Designation <sup>1</sup> | Site                                    |                                         |
|--------------------------------------------------|-------------|------------------------------------|-----------------------------------------|-----------------------------------------|
|                                                  |             |                                    | MPCAB_05RN029<br>(individuals recorded) | MPCAB_05RN077<br>(individuals recorded) |
| Total abundance                                  |             |                                    | 28                                      | 89                                      |
| Index of Biological Integrity (IBI) <sup>2</sup> |             |                                    | 25                                      | 60                                      |
| Predominant Substrate                            |             |                                    | sand                                    | sand                                    |

Source: MPCA 2011c.

Notes:

<sup>1</sup> Adapted from NCDENR 2006, Ohio EPA 1989, and Hubbs and Lagler 2007. Tolerance values indicate qualitative tolerances of physical and chemical disturbances.

<sup>2</sup> IBI is the sum of study specific metrics where 0 represents the worst fish assemblage conditions and 100 represents the best fish assemblage conditions (USEPA 2011a).

-- = no designation assigned.

**Table 4.3.6-4 Benthic Macroinvertebrate Attributes for Aquatic Biota Sampling Site MPCAB\_05RN029**

| Benthic Macroinvertebrate Attributes <sup>1</sup>  | MPCAB_05RN029 |
|----------------------------------------------------|---------------|
| EPT (mayfly, stonefly, caddisfly) Taxa             | 1             |
| Ephemeroptera (mayfly) Taxa                        | 1             |
| Hilsenhoff's Biotic Index (HBI)                    | 5.7           |
| Intolerant Families                                | 2             |
| Percent Pollution Tolerant                         | 3             |
| Percent Chironomidae (midges)                      | 69.5          |
| Percent Diptera (true flies)                       | 71.3          |
| Percent Dominant Taxa                              | 69.5          |
| Percent Dominant Two Taxa                          | 91.1          |
| Percent Filterers                                  | 0.9           |
| Percent Gatherers                                  | 92.3          |
| Percent Hydropsychidae (net- spinning caddisflies) | 0             |
| Percent Scraper                                    | 0             |
| Plecoptera (stonefly) Families                     | 0             |
| Total Families                                     | 11            |
| Trichoptera (caddisfly) Families                   | 0             |

Source: MPCA 2011c.

The majority of fish species found at the two sample sites were designated pollution-tolerant and intermediate species (Table 4.2.6-3). The IBI score of 25 at sample location MPCAB\_05RN029 was at the low end of the scale, indicating below-average fish communities existed. This is likely a function of the sampling location, as less diverse fish habitat may exist at headwater stream locations (Barbour et al. 1999).

The MPCAB\_05RN077 fourth-order stream sampling site results did not identify any intolerant fish species; however, with increasing stream order, fish diversity increases (Barbour et al. 1999) but is variable, as exhibited by the abundance values of 28 and 89 fish, respectively, in the first- and fourth-order study site locations. The IBI score of 60 at this fourth-order sampling location indicates above-average fish communities and habitat exist. The dominant sand substrates, as opposed to silt substrate, and apparent wide riparian shoreline characteristics at these two sampling sites would also indicate quality fish habitat exists at the sampling sites.

The third-order sections of the Pike River within Tract 1 likely display some similar fish habitats and communities compared to the two study locations.

Macroinvertebrate assemblages exhibited low Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa and were dominated by midges and true flies at the headwater sampling location referenced above for fish assemblages. The attributes collected for macroinvertebrates at this sampling site suggest diverse macroinvertebrate habitats were not present, which may be attributed to the headwater characteristics and substrate of the sampling site. The macroinvertebrate habitat available for the third-order segments of the Pike River within the Tract 1 parcel likely exhibit more diverse and high-quality habitats than the headwater macroinvertebrate sampling location.

### ***Special Status Fish and Macroinvertebrates***

No SGCN, state, federal, or RFSS species are known to occur within or in the immediate vicinity of Tract 1. Of the species listed as potentially occurring in the Nashwauk Uplands ecoregion or Superior National Forest (see Table 4.3.6-5), the northern brook lamprey and creek heelsplitter are the most likely species to occur at this parcel.

Suitable habitat for northern brook lamprey is likely to exist within Tract 1; however, the nearest known occurrence of this species is more than 19 miles from Tract 1.

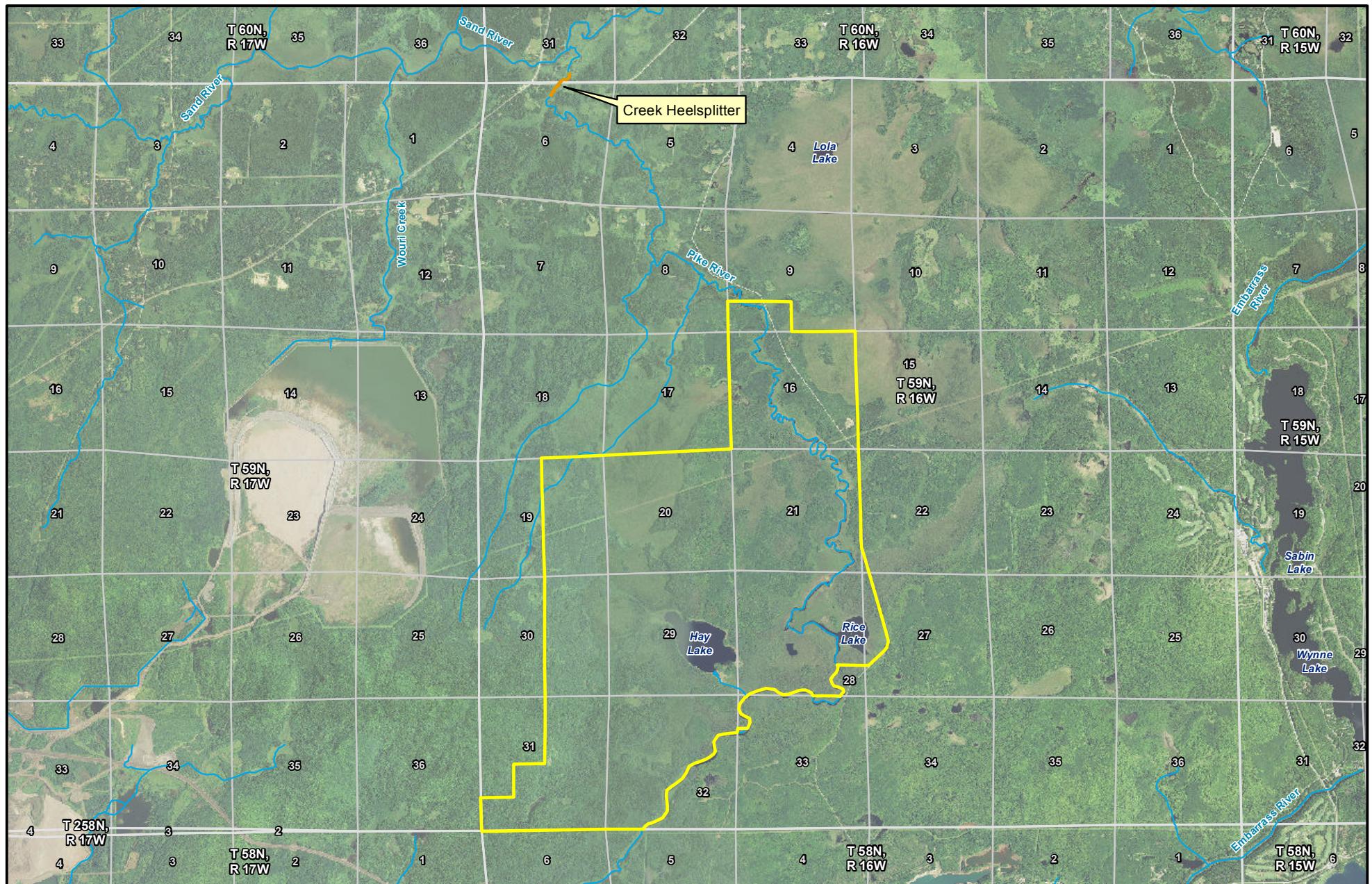
Suitable habitat likely exists for the creek heelsplitter in the third-order segments of the Pike River within Tract 1, as the substrate likely contains adequate sand substrate and flow to provide habitat for this freshwater mussel species. Additionally, this species has been documented 0.5 mile upstream of the Sand and Pike rivers confluence, where the Pike River becomes a fourth-order stream (see Figure 4.3.6-2).

***Table 4.3.6-5 SGCN and RFSS Species Identified within Portions of the Nashwauk Uplands Ecoregion or Superior National Forest***

| Scientific Name                 | Common Name                        | Nashwauk Uplands<br>Ecoregion SGCN | RFSS |
|---------------------------------|------------------------------------|------------------------------------|------|
| <b>Insects</b>                  |                                    |                                    |      |
| <i>Chilogstigma itascae</i>     | Headwaters chilogstigman caddisfly |                                    | X    |
| <i>Somatochlora brevicincta</i> | Quebec emerald                     |                                    | X    |
| <i>Williamsonia flechen</i>     | Ebony boghaunter                   |                                    | X    |
| <b>Fish</b>                     |                                    |                                    |      |
| <i>Acipenser fulvescens</i>     | Lake sturgeon                      |                                    | X    |
| <i>Coregonus nigripinnis</i>    | Nipigon cisco                      |                                    | X    |
| <i>Coregonus zenithicus</i>     | Shortjaw cisco                     |                                    | X    |
| <i>Ichthyomyzon fossor</i>      | Brook lamprey                      | X                                  | X    |
| <b>Mussels</b>                  |                                    |                                    |      |
| <i>Lasmigona compressa</i>      | Creek heelsplitter                 | X                                  | X    |
| <i>Ligumia recta</i>            | Black sandshell                    | X                                  | X    |

Sources: MDNR 2006d; FEIS Appendix D.

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  Non-federal Lands      Section Boundary  
  Creek Heelsplitter    1 Section Label  
  Stream / River



0 0.25 0.5 1 1.5 Miles



**Figure 4.3.6-2**  
**Creek Heelsplitter Locations Near Tract 1 - Hay Lake Lands**  
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#### **4.3.6.2.2 Tract 2 - Lake County Lands**

No lakes or waterbodies are known to exist within Tract 2 (AECOM 2011d); therefore, no fish or macroinvertebrate habitats are present.

#### **4.3.6.2.3 Tract 3 - Wolf Lands**

##### **Surface Water Features**

Coyote Creek is the only surface water feature within the Wolf Lands 3 and 4. Wolf Lands 1 and 2 do not have surface water features. Coyote Creek is a headwater stream that begins in Wolf Lands 3 where it flows north for 0.1 mile within the parcel boundary and includes approximately 32.8 acres of unmapped floodplain. Coyote Creek continues north and flows for 0.9 mile within Wolf Lands 4 before continuing further north, and includes approximately 79.4 acres of unmapped floodplain. The heavily vegetated riparian habitats and associated floodplains adjacent to the river's edge likely provide important fish and macroinvertebrate habitats. Coyote Creek flows through two of the three lakes in the McDougal Lakes chain and becomes a third-order stream (see Figure 4.3.6-3) at its confluence with the Stony River approximately 4 river miles downstream from the northern boundary of Wolf Lands 4. Wolf Lands 3 and 4 contain a combined 16.1 ft of river frontage per acre. Aerial photograph review indicates a wide riparian vegetative buffer with minimal human disturbance where emergent sedge-meadow wetlands are adjacent to the creek within the Wolf Lands 3 parcel, and both emergent and scrub-shrub wetlands are adjacent to the creek within the Wolf Lands 4 parcel (AECOM 2011c). The riparian vegetative buffer adjacent to the creek segments offers shade, structure, and erosion control.

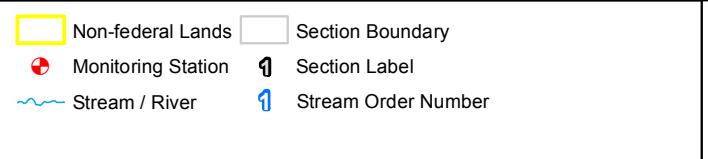
Much of the emergent wetlands adjacent to Coyote Creek within the Wolf Lands 3 parcel exhibited 18 to 24 inches of standing water (AECOM 2011c), which could provide high-quality headwater stream fish and macroinvertebrate habitats because wetlands provide nutrient-rich environments that would be accessible to fish and macroinvertebrates at the documented water depth. Additionally, these wetlands likely provide potential spawning habitat for some warmwater fish species that require headwater wetland habitats for spawning.

The USFS MIH categories within the combined Wolf Lands parcels 3 and 4 boundaries include approximately 10,560 linear ft of creek shoreline.

##### **Aquatic Biota Studies**

No fish or macroinvertebrate studies have been completed along Coyote Creek within the two parcels; however, two MPCA aquatic biota studies (MPCAB\_05RN024 and MPCAB\_05RN074) were completed within the third- and fourth-order stretches of the Stony River, approximately 2 river miles and 4 river miles, respectively, downstream of the Coyote Creek and Stony River confluence, as indicated in Figure 4.3.6-3 (6 and 8 miles downstream of northern boundary of parcel Wolf Lands 4) (MPCA 2011c). Results from the two sampling events are summarized below in Table 4.3.6-6 and Table 4.3.6-7. The fish communities for both sampling sites appeared diverse and abundance was high. IBI scores for each site were high, indicating good to excellent fish habitat was likely present. Although high-quality fish habitat likely exists at the Coyote Creek stream locations within Wolf Lands 3 and 4, some, but not all, of the fish species observed at the Stony River sampling locations are likely present, as fish community diversity is likely less in headwater stream habitats.

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0 0.25 0.5 1 1.5 Miles



**Figure 4.3.6-3**  
**Monitoring Sample Site Locations**  
**Tract 3 - Wolf Lands**  
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A qualitative assessment of the benthic macroinvertebrate data presented in Table 4.3.6-7 indicates a diverse community with attributes indicating little human disturbance or sedimentation at the Stony Creek sampling sites. The Coyote Creek headwater stretches of stream likely exhibit more siltation due to slower moving water typically observed in headwater streams in the region and, therefore, likely offer less diverse habitats for benthic macroinvertebrates compared to the two sampling sites summarized below.

**Table 4.3.6-6 Fish Species Collected at Two Sites in the Vicinity of the Wolf Lands Parcels within the Stony River**

| Scientific Name                                  | Common Name       | Tolerance Designation <sup>1</sup> | Site                               |                                 |
|--------------------------------------------------|-------------------|------------------------------------|------------------------------------|---------------------------------|
|                                                  |                   |                                    | MPCAB_05RN024<br>(number recorded) | MPCAB_05RN074 (number recorded) |
| <i>Catostomus commersonii</i>                    | White sucker      | Tolerant                           | 21                                 | 4                               |
| <i>Luxilus cornutus</i>                          | Common shiner     | Intermediate                       |                                    | 23                              |
| <i>Notemigonus crysoleucas</i>                   | Golden shiner     | Tolerant                           | 2                                  | 84                              |
| <i>Notropis hudsonius</i>                        | Spottail shiner   | Intermediate                       | 19                                 | 11                              |
| <i>Notropis heterolepis</i>                      | Blacknose shiner  | Intolerant                         | 1                                  | 123                             |
| <i>Notropis volucellus</i>                       | Mimic shiner      | Intolerant                         | 6                                  | 29                              |
| <i>Etheostoma nigrum</i>                         | Johnny darter     | Intermediate                       | 8                                  | 2                               |
| <i>Perca flavescens</i>                          | Yellow perch      | Intermediate                       | 31                                 | 93                              |
| <i>Sander vitreus</i>                            | Walleye           | Intermediate                       |                                    | 2                               |
| <i>Percina caprodes</i>                          | Logperch          | Intermediate                       | 4                                  | 3                               |
| <i>Lota lota</i>                                 | Burbot            | Intermediate                       | 85                                 | 3                               |
| <i>Ambloplites rupestris</i>                     | Rock bass         | Intermediate                       |                                    | 2                               |
| <i>Esox lucius</i>                               | Northern pike     | Intermediate                       |                                    | 12                              |
| <i>Umbra limi</i>                                | Central mudminnow | Tolerant                           | 1                                  |                                 |
| <i>Pimephales promelas</i>                       | Fathead minnow    | Tolerant                           | 6                                  |                                 |
| <i>Rhinichthys cataractae</i>                    | Longnose dace     | Intolerant                         | 177                                |                                 |
| <i>Noturus gyrinus</i>                           | Tadpole madtom    | Intermediate                       | 7                                  | 7                               |
| <i>Cottus bairdii</i>                            | Mottled sculpin   | Intolerant                         | 19                                 |                                 |
| Study year                                       |                   |                                    | 2005                               | 2005                            |
| Species observed                                 |                   |                                    | 14                                 | 14                              |
| # intolerant species                             |                   |                                    | 4                                  | 2                               |
| Total Abundance                                  |                   |                                    | 387                                | 398                             |
| Index of Biological Integrity (IBI) <sup>2</sup> |                   |                                    | 86                                 | 77                              |
| Predominant Substrate                            |                   |                                    | rubble/cobble                      | na                              |

Source: MPCA 2011c.

Notes:

<sup>1</sup> Adapted from NCDENR 2006, Ohio EPA 1989, and Hubbs and Lagler 2007. Tolerance values indicate qualitative tolerances of physical and chemical disturbances.

<sup>2</sup> IBI is the sum of study specific metrics where 0 represents the worst fish assemblage conditions and 100 represents the best fish assemblage conditions (USEPA 2011b).

na = Not available

-- = no designation assigned.

**Table 4.3.6-7 Benthic Macroinvertebrate Attributes for Aquatic Biota Sampling Sites within the Stony River**

| Benthic Macroinvertebrate Attributes <sup>1</sup> | MPCAB_05RN024 | MPCAB_05RN074 |
|---------------------------------------------------|---------------|---------------|
| EPT (mayfly, stonefly, caddisfly) Taxa            | 11            | 11            |
| Ephemeroptera (mayfly) Taxa                       | 5             | 5             |
| Hilsenhoff's Biotic Index (HBI)                   | 5.9           | 5.2           |
| Intolerant Families                               | 4             | 1             |
| % Pollution Tolerant                              | 10.3          | 26.1          |
| % Chironomidae (midges)                           | 55.5          | 17.2          |
| % Diptera (true flies)                            | 58.7          | 17.5          |
| % Dominant Taxa                                   | 55.5          | 18.8          |
| % Dominant Two Taxa                               | 63.7          | 36            |
| % Filterers                                       | 11.7          | 17.8          |
| % Gatherers                                       | 75.4          | 50.2          |
| % Hydropsychidae (net- spinning caddisflies)      | 1.4           | 11.9          |
| % Scraper                                         | 5             | 25.4          |
| Plecoptera (stonefly) Families                    | 0             | 0             |
| Total Families                                    | 23            | 27            |
| Trichoptera (caddisfly) Families                  | 6             | 6             |

Source: MPCA 2011c.

### **Special Status Fish and Macroinvertebrates**

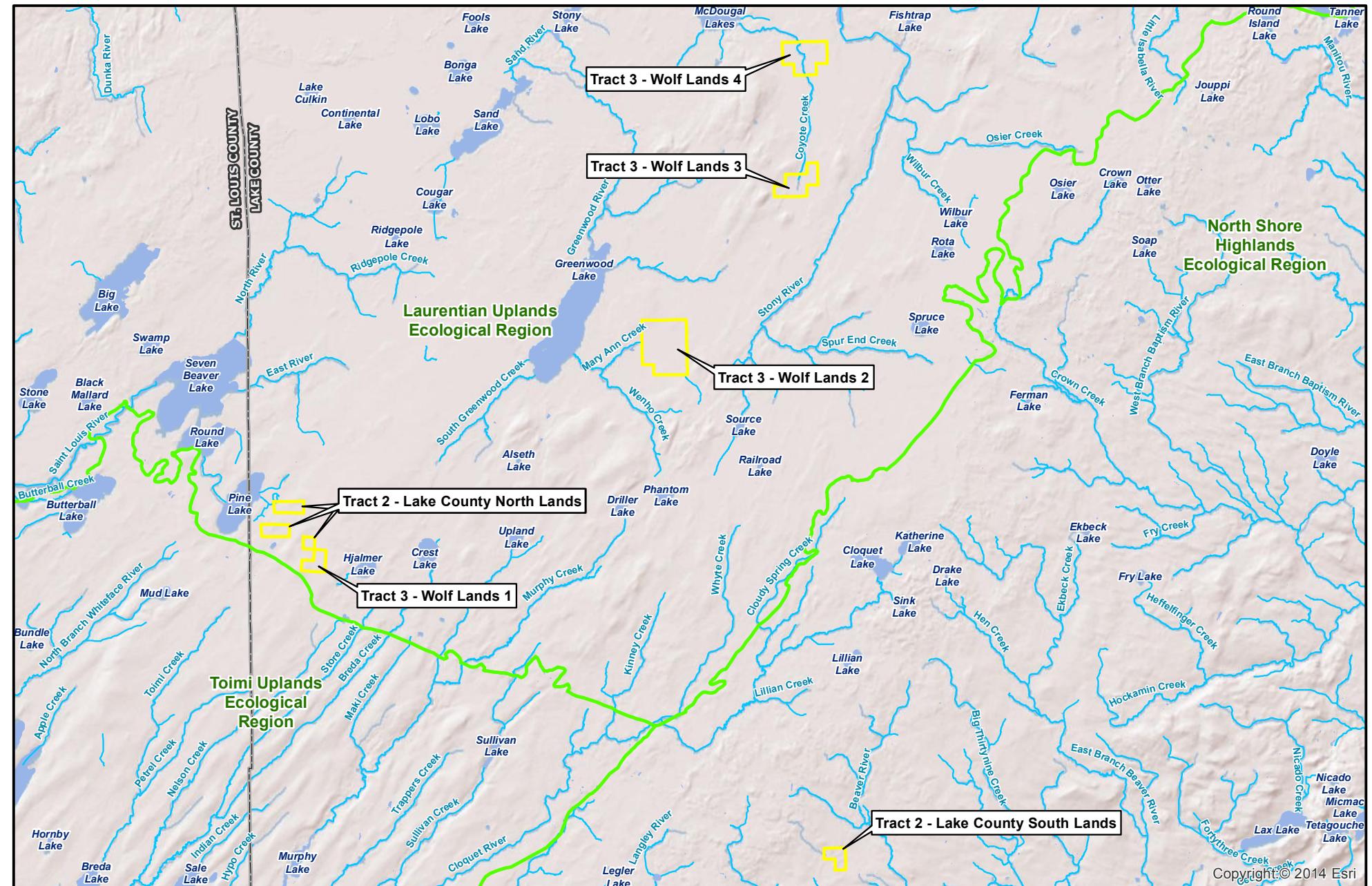
No SGCN, state, federal, or RFSS species are known to occur at or in the immediate vicinity of Tract 3. Of the species listed to potentially occur in the Laurentian Uplands ecoregion (see Figure 4.3.6-4) or Superior National Forest (see Table 4.3.6-8), the northern brook lamprey and creek heelsplitter are the most likely species to occur within Tract 3.

Suitable habitat for northern brook lamprey is likely to exist in Tract 3, although the nearest known occurrence of this species is more than 52 miles from the Wolf Lands parcels.

The creek heelsplitter has historically been found near the east and west confluence of the northernmost lake in the chain of McDougal Lakes and the Stony River in the third-order stretch of the Stony River (see Figure 4.3.6-5). The aquatic species habitat in the stretches of Coyote Creek within Wolf Lands 3 and 4 is unknown, but likely would display first-order headwater stream characteristics; it is unknown if the necessary aquatic species habitat for the creek heelsplitter is present on the parcels. However, the presence of the creek heelsplitter within the parcel boundary is possible but not likely, since Coyote Creek is a first-order stream.

Habitats for the other special status species described in Table 4.3.6-8 likely do not exist within the parcel boundary.

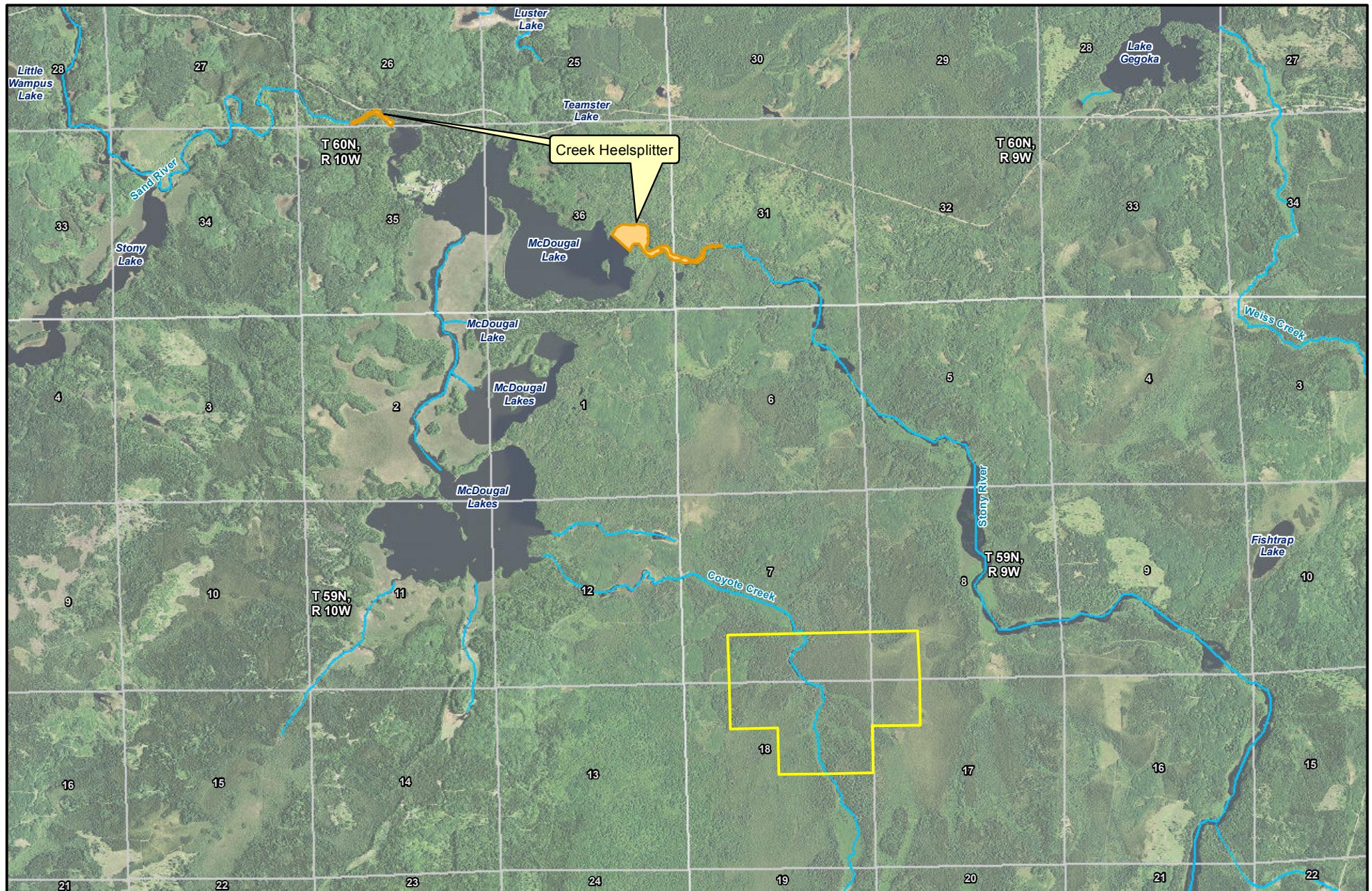
No invasive fish or macroinvertebrate species are known to exist on Tract 3.



**Figure 4.3.6-4**  
**Ecological Regions**  
**Tract 2 - Lake County and Tract 3 - Wolf Lands**  
 NorthMet Mining Project and Land Exchange FEIS  
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  Non-federal Lands     Section Boundary  
  Creek Heelsplitter   1 Section Label  
  Stream / River



0   0.25   0.5   1 Miles



**Figure 4.3.6-5**  
**Creek Heelsplitter Locations Near**  
**Tract 3 - Wolf Lands 4**  
**NorthMet Mining Project and Land Exchange FEIS**  
**Minnesota**

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**Table 4.3.6-8 SGCN and RFSS Species Identified within Portions of the Laurentian Uplands Ecoregion or Superior National Forest**

| Scientific Name                 | Common Name                       | Laurentian Uplands Ecoregion SGCN | RFSS |
|---------------------------------|-----------------------------------|-----------------------------------|------|
| <b>Insects</b>                  |                                   |                                   |      |
| <i>Chilostigma itascaae</i>     | Headwaters chilostigman caddisfly | X                                 |      |
| <i>Somatochlora brevicincta</i> | Quebec emerald                    | X                                 |      |
| <i>Williamsonia flechen</i>     | Ebony boghaunter                  | X                                 |      |
| <b>Fish</b>                     |                                   |                                   |      |
| <i>Acipenser fulvescens</i>     | Lake sturgeon                     | X                                 |      |
| <i>Coregonus nigripinnis</i>    | Nipigon cisco                     | X                                 |      |
| <i>Coregonus zenithicus</i>     | Shortjaw cisco                    | X                                 |      |
| <i>Ichthyomyzon fossor</i>      | Brook lamprey                     | X                                 |      |
| <b>Mussels</b>                  |                                   |                                   |      |
| <i>Lasmigona compressa</i>      | Creek heelsplitter                | X                                 | X    |
| <i>Ligumia recta</i>            | Black sandshell                   | X                                 | X    |

Source: MDNR 2006d; FEIS Appendix D.

#### 4.3.6.2.4 Tract 4 - Hunting Club Lands

##### **Surface Water Features**

No lakes or waterbodies are known to exist within Tract 4 (AECOM 2011d); therefore, no fish or macroinvertebrate habitats exist.

#### 4.3.6.2.5 Tract 5 - McFarland Lake Lands

##### **Surface Water Features**

The only surface water feature within Tract 5 is the 990 ft of shoreline associated with McFarland Lake along the eastern parcel boundary. McFarland Lake is classified as an oligotrophic lake (MPCA 2011c) with a surface area of 384 acres and a maximum depth of 49 ft (MDNR 2011c). Aerial photograph review indicates minimal shoreline disturbance and a wide riparian vegetative buffer along the entire parcel boundary with McFarland Lake.

The USFS MIH represented in Tract 5 (MIH 14, Aquatic Habitats) would include 990 linear ft of lake shoreline.

##### **Aquatic Biota Studies**

MDNR conducted a fishery assessment within McFarland Lake in 2003 and reported several game fish species including lake whitefish, northern pike, smallmouth bass, walleye, and yellow perch (MDNR 2011c). Tulibee and white sucker were also recorded. These species are typical for large and deep lakes within the region.

##### **Special Status Fish and Macroinvertebrates**

No special status fish or macroinvertebrates are known to exist within Tract 5. A summary of the SGCN and RFSS species is provided in Table 4.3.6-9. The spoonhead sculpin, lake chub, and longear sunfish are known to occur within the Border Lakes ecoregion and could occur at Tract 5 (see Figure 4.3.6-6). These species are described below. Due to limiting habitat requirements and

limited distribution, the remaining species listed in Table 4.6.3-9 likely are not present in McFarland Lake.

The invasive species, spiny water flea (*Bythotrephes longimanus*), has been documented in McFarland Lake. The spiny water flea is a species of zooplankton native to Europe and Asia that competes for food sources with other zooplankton species and fish.



0 0.25 0.5 1 1.5 Miles



**Figure 4.3.6-6**  
**Ecological Regions**  
**Tract 5 - McFarland Lake Lands**  
 NorthMet Mining Project and Land Exchange FEIS  
 Minnesota

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**Table 4.3.6-9 SGCN Species for the Border Lakes Ecoregion and the USFS RFSS Species List**

| Scientific Name                 | Common Name                       | Border Lakes<br>Ecoregion SGCN | RFSS |
|---------------------------------|-----------------------------------|--------------------------------|------|
| <b>Insects</b>                  |                                   |                                |      |
| <i>Chilostigma itascaae</i>     | Headwaters chilostigman caddisfly |                                | X    |
| <i>Somatochlora brevicincta</i> | Quebec emerald                    |                                | X    |
| <i>Williamsonia flechen</i>     | Ebony boghaunter                  |                                | X    |
| <b>Fish</b>                     |                                   |                                |      |
| <i>Acipenser fulvescens</i>     | Lake sturgeon                     | X                              | X    |
| <i>Coregonus nigripinnis</i>    | Nipigon cisco                     | X                              | X    |
| <i>Coregonus zenithicus</i>     | Shortjaw cisco                    | X                              | X    |
| <i>Cottus ricei</i>             | Spoonhead sculpin                 | X                              |      |
| <i>Couesius plumbeus</i>        | Lake chub                         | X                              |      |
| <i>Ichthyomyzon fossor</i>      | Brook lamprey                     | X                              | X    |
| <i>Lepomis megalotis</i>        | Longear sunfish                   | X                              |      |
| <b>Mussels</b>                  |                                   |                                |      |
| <i>Lasmigona compressa</i>      | Creek heelsplitter                | X                              | X    |
| <i>Ligumia recta</i>            | Black sandshell                   | X                              | X    |

Sources: MDNR 2006d; FEIS Appendix D.

### ***Spoonhead Sculpin***

The spoonhead sculpin is a bottom dwelling fish that inhabits rocky areas of swift creeks and rivers; however, this species can also be found in lakes. They primarily feed on planktonic crustaceans and aquatic insect larvae and are native to Minnesota (Froese and Pauly 2011). Little is known about the habitat and macroinvertebrates in McFarland Lake. Although the habitat characteristics for McFarland Lake are not completely known, it is possible the spoonhead sculpin species exists in McFarland Lake.

### ***Lake Chub***

Lake chubs have a secure distribution in Lake Superior, but have shown declining distribution in Minnesota inland lakes. Their preferred habitat includes shallow areas of deep lakes, especially near river mouths (Stasiak 2006). Habitat for lake chub may exist in McFarland Lake.

### ***Longear Sunfish***

The longear sunfish is found in lake and stream habitats, which include high-quality waters with shallow (less than 3 ft) shorelines exhibiting firm, detritus rich substrates and extensive submerged vegetation. Only 37 Minnesota lakes and streams have confirmed populations of this fish species (Porterfield and Ceas 2008). Habitat for longear sunfish may exist in portions of McFarland Lake.

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#### **4.3.7    *Air Quality***

Regional air quality, including for the federal and non-federal lands, is discussed in Section 4.2.7. The federal lands of the Land Exchange Proposed Action are similar to the Mine Site previously discussed, but exclude the privately owned land bordering Dunka Road to the south of the Mine Site. The non-federal parcels are all privately owned and there are currently no activities on these parcels that affect ambient air quality.

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## **4.3.8 Noise and Vibration**

### **4.3.8.1 Federal Lands**

The topography and land cover of the federal lands in the Land Exchange Proposed Action and the Land Exchange Alternative B are similar to that of the Mine Site, as previously discussed, but extend further north and west (mostly wetlands) and exclude the privately owned land bordering Dunka Road to the south of the Mine Site. Section 4.2.8.2 provides a discussion of the existing noise and vibration conditions on the federal lands.

### **4.3.8.2 Non-federal Lands**

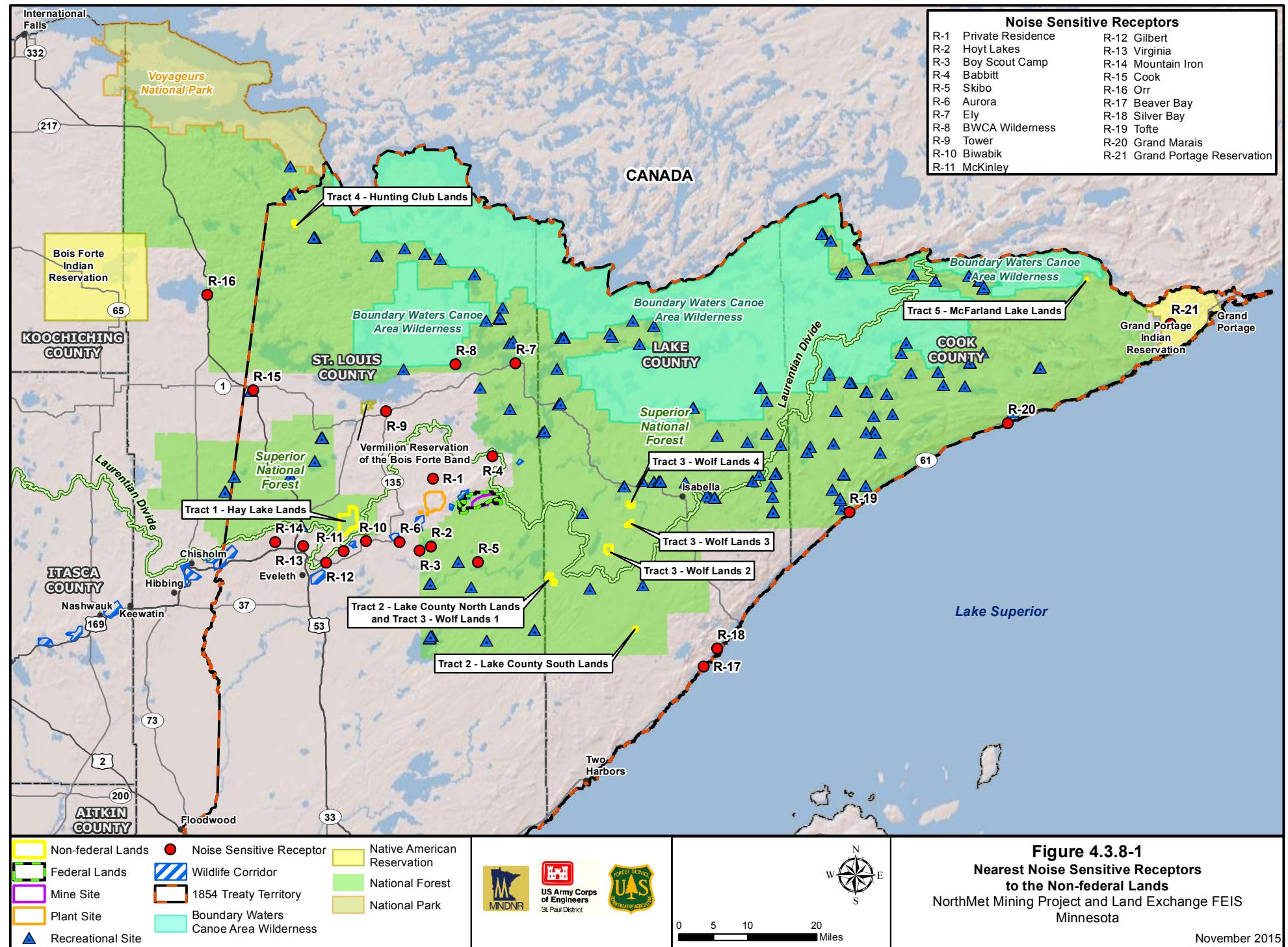
The non-federal lands in the Land Exchange Proposed Action consist of up to five tracts totaling 7,075.0 acres that are located within the Superior National Forest proclamation boundary, a sparsely populated rural region in northeast Minnesota. The tracts are predominantly forest and wetland habitat. Tracts 1, 2, and 3 are 13 to 27 miles from the federal lands, while Tracts 4 and 5 are 46 and 91 miles from the federal lands, respectively (see Table 4.3.8-1 and Figure 4.3.8-1).

**Table 4.3.8-1 Approximate Distances and Direction of Non-federal Lands to Federal Lands and the Plant Site**

| <b>Tract</b>             | <b>Approximate Distance to Federal Lands (miles)</b> | <b>Approximate Distance to Plant Site (miles)</b> | <b>Direction from Federal Lands and Plant Site</b> |
|--------------------------|------------------------------------------------------|---------------------------------------------------|----------------------------------------------------|
| Tract 1 – Hay Lake       | 15                                                   | 10                                                | West                                               |
| Tract 2 – Lake County    |                                                      |                                                   |                                                    |
| Lake County North        | 13                                                   | 20                                                | Southeast                                          |
| Lake County South        | 27                                                   | 34                                                | Southeast                                          |
| Tract 3 – Wolf Lands     |                                                      |                                                   |                                                    |
| Wolf Lands 1             | 14                                                   | 20                                                | Southeast                                          |
| Wolf Lands 2             | 18                                                   | 26                                                | Southeast                                          |
| Wolf Lands 3             | 18                                                   | 26                                                | Southeast                                          |
| Wolf Lands 4             | 18                                                   | 26                                                | East                                               |
| Tract 4 – Hunting Club   | 46                                                   | 43                                                | Northwest                                          |
| Tract 5 – McFarland Lake | 91                                                   | 100                                               | Northeast                                          |

Review of the most-up-to-date aerial maps indicates that there are no noise-sensitive areas or receptors (e.g., residences, schools, campgrounds, or national wilderness areas) within the non-federal lands. However, people currently hunt within Tract 1 and Tract 4 due to the presence of wildlife. Wildlife species within each tract are described in Section 4.3.5. There are a few residential receptors outside the non-federal lands. Figure 4.3.8-1 shows the locations of the closest receptors to the non-federal lands.

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The non-federal lands would be managed consistent with the adjacent forest lands (see Section 4.3.1), and the USFS currently has no plans for operations on the non-federal lands. Since the non-federal lands are located in a forested and rural environment, the existing ambient  $L_{eq}$  at the five tracts has been assumed to be 5 dB lower than the levels shown in Table 4.2.8-2 for the Mine Site and Plant Site. This means that existing daytime and nighttime ambient  $L_{eq}$  for all non-federal lands are not expected to exceed 40 and 30 dB, respectively. The estimated  $L_{eq}$  for the statistical distribution was converted to other noise percentile metrics, such as  $L_{50}$  and  $L_{10}$ , using a USEPA calculation methodology (USEPA 1974). The calculation was based on an assumed standard deviation of 3 dB for the sound level statistical distribution. A summary of the estimated daytime and nighttime ambient  $L_{eq}$ ,  $L_{50}$ , and  $L_{10}$  levels expected at the tracts is presented in Table 4.3.8-2.

**Table 4.3.8-2   Summary of Estimated Existing Ambient Noise Levels at the Non-federal Lands**

| Ambient Noise Level Metric | Daytime (dBA) | Nighttime (dBA) |
|----------------------------|---------------|-----------------|
| $L_{eq}$                   | 40            | 30              |
| $L_{50}$                   | 39            | 29              |
| $L_{10}$                   | 42.8          | 32.8            |

Currently, no ground- or air-vibrating sources or activities (e.g., mine blasting or pile driving) exist within a 15-mile radius of the non-federal lands. The closest vibration-generating activities include operation of the coal and flux pulverizer and rotary hearth furnace at the Mesabi Phase I Plant in Hoyt Lakes (approximately 9 miles west of Tract 1, which is the closest non-federal tract) and blasting at the Northshore Mine (approximately 16 miles northwest of the closest tract [Tract 2]). Since ground and air vibration effects diminish with distance from the source, existing levels of vibration at the sensitive receptors are expected to be negligible.

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## **4.3.9 Cultural Resources**

### **4.3.9.1 Federal Lands**

#### **4.3.9.1.1 Land Exchange Proposed Action**

The federal lands within the Land Exchange Proposed Action area is similar to the Mine Site portion of the NorthMet Project area previously discussed, but extends further north and west and excludes the privately owned land bordering Dunka Road to the south of the Mine Site. The Land Exchange Proposed Action APE for both direct and indirect effects consists of the entire land exchange boundary (Figure 4.2.9-1). Section 4.2.9 provides further discussion of the existing conditions on the Mine Site and associated federal lands. Cultural resources identified within the Land Exchange Proposed Action area consisted of archaeological sites and properties and natural resources of religious and cultural significance to the Bands.

As a result of Phase I cultural resources surveys and consultation with the Bands and the SHPO concerning the results of identification efforts for properties of religious and cultural significance to the Bands, three cultural resources have been identified within the Land Exchange area: the BBLV Trail Segment, NorthMet Archaeological Site, and Knot Logging Camp. For detailed property descriptions and discussions of eligibilities, please see Section 4.2.9.

The investigations completed in the Land Exchange Proposed Action area have identified cultural resources as summarized in Table 4.3.9-1 below.

***Table 4.3.9-1 Cultural Resources Identified in the Land Exchange Area***

| <b>Resource ID</b> | <b>Resource Name</b>            | <b>Resource Type</b> | <b>NRHP Determination by Co-lead Agencies</b> | <b>SHPO Concurrence with Co-lead Agencies'</b> |
|--------------------|---------------------------------|----------------------|-----------------------------------------------|------------------------------------------------|
| SL-HLC-069         | BBLV Trail Segment <sup>1</sup> | Archaeological Site  | Eligible                                      | Concur                                         |
| 21SLPending        | NorthMet Archaeological Site    | Archaeological Site  | Not Eligible                                  | Concur                                         |
| 21SLmn             | Knot Logging Camp               | Archaeological Site  | Not Eligible                                  | Concur                                         |

Note:

<sup>1</sup> USFS designation BBLV Trail Segment #1 (USFS #01-569).

The 1854 Treaty resources located within the Land Exchange Proposed Action would be similar to the Mine Site portion of the NorthMet Project area previously discussed in Section 4.2.9. Section 4.2.9 provides further discussion of the existing conditions on the Mine Site and associated federal lands.

An analysis of whether any particular property associated with the Bands' exercise of their usufructuary rights may be considered a TCP is limited by lack of available information regarding Band members' traditional exercise of those rights. Determining how the Bands have traditionally conducted their usufructuary rights on or near the Land Exchange Proposed Action area would only be available through a detailed ethnographic study of individual Band members and their families. The cultural resources investigations included Band member interviews with

Bois Forte, Fond du Lac, and Grand Portage, although only Bois Forte's results were made available. The results of the interviews and the cultural resources investigation did not find any natural resources that would be considered a TCP or other traditional cultural place.

#### **4.3.9.1.2 Land Exchange Alternative B**

All of the cultural resources and 1854 Treaty resources identified and discussed in Section 4.3.9.1.1 are located within the Land Exchange Alternative B.

#### **4.3.9.2 Non-federal Lands**

There are no known cultural resources on the non-federal lands, except known 1854 Treaty resources consisting of wild rice beds within the Hay Lake lands. As discussed in Section 4.3.2, Hay Lake, Rice Lake, and the Pike River are the only waterbodies within the proposed non-federal land exchange tracts known to contain wild rice beds.

### **4.3.10 Socioeconomics**

The Land Exchange Proposed Action study area for socioeconomics is the same as for the NorthMet Project Proposed Action: all of Cook, Lake, and St. Louis counties, as well as individual cities in St. Louis County (see Figure 4.2.10-1). This geography includes the federal and non-federal tracts. Socioeconomic data are not available, and thus are not reported, for the individual non-federal tracts and their parcels.

The federal lands are similar to that of the Mine Site previously discussed, but exclude the privately owned land bordering Dunka Road to the south of the Mine Site. Section 4.2.10.1 provides additional discussion of the existing conditions on the federal lands. The socioeconomic information in Section 4.2.10.1 broadly applies to the study area, which encompasses all of the non-federal parcels involved in the Land Exchange Proposed Action. The following provides additional information as it relates to the federal and non-federal parcels.

#### **4.3.10.1 Economic Activity**

There is no ongoing forestry activity on the federal lands and no evidence of recent past forestry activity. The non-federal parcels are all privately owned or otherwise have no official public access. There is some evidence of timber harvesting on Tracts 2, 3, and 4; this activity could generate income, employment, or revenue.

#### **4.3.10.2 Recreation**

Recreation in national forests can generate direct revenue to the USFS and the state in the form of entry fees and hunting and fishing license fees, as well as via indirect economic activity related to the multiplier effect of such activity (e.g., purchase of fishing tackle and bait).

In 2006 (the most recent year for which data are available), there were approximately 1,376,000 recreational visits to Superior National Forest (USFS 2012a). “Recreational,” as used in USFS 2010, is very broadly defined, and primarily distinguishes (and excludes) transient visitors such as commuters or for restroom visits. On average, visitors to the forest spent \$643 per visiting party per day (i.e., the group participating in the visit, such as a family).

Currently, the federal lands are not easily accessible. The non-federal parcels are all privately owned or otherwise have no official public access, although evidence of recreational activity has been observed on some of these parcels. Such activity is discussed in Section 4.2.11.

#### **4.3.10.3 Other Socioeconomic Characteristics**

Currently, there is no demand for public safety services on the inaccessible federal lands and only limited demand on the non-federal lands. As described in Section 4.2.11, the non-federal parcels generally consist of undeveloped woodlands, wetlands, and other natural features. There is evidence of past extractive activity (quarrying and/or borrowing of sand and gravel) and ongoing private recreational hunting and fishing on Tract 1. Tract 5 was previously used by Wheaton College. In their current state, the non-federal parcels have minimal, if any, effect on public services and facilities.

Subsistence activity, as it relates to the federal lands, is described in Section 4.2.10.1.6. There is no available information that any of the non-federal tracts are being used for this purpose.

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### **4.3.11 Recreation and Visual Resources**

#### **4.3.11.1 Federal Lands**

##### **4.3.11.1.1 Land Exchange Proposed Action**

###### **Recreational Resources**

The federal lands fall within the Semi-Primitive Motorized and Roaded Natural ROS designations, as shown in Table 4.3.11-1. These designations are defined in Section 4.2.11.1.1.

**Table 4.3.11-1 Recreational Opportunity Spectrum Designations within the Land Exchange Proposed Action and Land Exchange Alternative B**

| Recreational Opportunity Spectrum Designation      | Total Acreage |
|----------------------------------------------------|---------------|
| <b>Land Exchange Proposed Action Federal Lands</b> |               |
| Semi-Primitive Motorized                           | 5,528.4       |
| Roaded Natural                                     | 967.0         |
| <b>Land Exchange Alternative B Federal Lands</b>   |               |
| Semi-Primitive Motorized                           | 4,276.5       |
| Roaded Natural                                     | 476.1         |

###### **Visual Resources**

The visual resources surrounding the federal lands, visual receptors near the federal lands, and SIO designation of the federal lands are discussed in Section 4.2.11.1.2. SIO designations are also summarized in Table 4.3.11-2.

**Table 4.3.11-2 Scenic Integrity Objective Designations for Lands under the Land Exchange Proposed Action and Land Exchange Alternative B**

| Scenic Integrity Objective Designation             | Total Acreage |
|----------------------------------------------------|---------------|
| <b>Land Exchange Proposed Action Federal Lands</b> |               |
| Low Scenic Integrity Objective                     | 6,495.6       |
| No Designation <sup>1</sup>                        | 30.5          |
| <b>Land Exchange Alternative B Federal Lands</b>   |               |
| Low Scenic Integrity Objective                     | 4,743.7       |
| No Designation <sup>1</sup>                        | 8.9           |

Note:

<sup>1</sup> USFS does not designate SIO for bodies of water, such as Mud Lake, which is part of the federal lands. Only a portion of Mud Lake falls within the footprint of the Land Exchange Alternative B.

#### **4.3.11.1.2 Land Exchange Alternative B**

The recreational and visual conditions for the federal lands in Land Exchange Alternative B are similar to the federal lands in the Land Exchange Proposed Action. Acreage of ROS and SIO designations for the Land Exchange Alternative B are summarized in Tables 4.3.11-1 and 4.3.11-2.

### 4.3.11.2 Non-federal Lands

All of the non-federal lands are privately owned; those not already owned by PolyMet are under options to purchase by PolyMet. Thus, there are no current public recreation opportunities on any of the tracts. Observed and likely private recreational activity on the non-federal lands is described below, based on aerial photography, research, and field visits conducted in October 2011. For reference, ownership surrounding the non-federal lands is shown in Figures 4.3.1-2, 4.3.1-3, and 4.3.1-4.

#### 4.3.11.2.1 Forest Service Recreation Designations

The ROS designations for areas surrounding the non-federal lands are summarized in Table 4.3.11-3. The Semi-Primitive Motorized and Roaded Natural ROS designations are defined in Section 4.2.11.1.1. The Semi-Primitive Non-Motorized designation is similar to the Semi-Primitive Motorized, except that motor vehicles are not permitted.

**Table 4.3.11-3 Recreational Opportunity Spectrum Designations in the Vicinity of Non-federal Lands**

| Tract                    | Adjacent/Nearby ROS Designations                                                                                                 |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 1 – Hay Lake Lands       | Semi-Primitive Motorized, Semi-Primitive Non-Motorized, and Roaded Natural                                                       |
| 2 – Lake County Lands    | Semi-Primitive Non-Motorized (Lake County South); Semi-Primitive Motorized, and Semi-Primitive Non-Motorized (Lake County North) |
| 3 – Wolf Lands           | Semi-Primitive Motorized and Roaded Natural                                                                                      |
| 4 – Hunting Club Lands   | Semi-Primitive Motorized                                                                                                         |
| 5 – McFarland Lake Lands | Semi-Primitive Non-Motorized and Semi-Primitive Motorized                                                                        |

#### 4.3.11.2.2 Regional Recreational Resources

The Superior National Forest, including the BWCAW, and Voyageurs National Park are important recreation areas in northeastern Minnesota. The Superior National Forest includes approximately 3 million acres and provides recreation opportunities for camping, boating, fishing, hiking, viewing scenery, off-highway vehicle riding, wilderness related recreation, snowmobiling, and cross country skiing. Located 20 miles to the north of the NorthMet Project area, the million-plus-acre BWCAW is protected as part of the National Wilderness Preservation System. Voyageurs National Park is located approximately 50 miles north of the NorthMet Project area (see Figure 1.1-1). In addition, there are year-round recreation opportunities at Giants Ridge (approximately 15 miles east of the Mine Site) that include downhill skiing, snowboarding, cross-country skiing, snowmobiling, mountain biking, hiking, and golf. There are also opportunities for biking, hiking, roller-blading on the Mesabi Trail which spans 70 miles across the Iron Range.

#### 4.3.11.2.3 Forest Service Scenic Integrity Designations

The non-federal lands are all within the Superior National Forest proclamation boundary, and are surrounded by relatively flat terrain covered in forests and wetlands. Some of the tracts are located within a few miles of towns, mines, and active forestry activity. The Mine Site would not be visible from any of the non-federal tracts. SIO designations for portions of Superior National Forest surrounding the five tracts are summarized in Table 4.3.11-4. Definitions of the SIO designations are provided in Section 4.2.11.1.2.

**Table 4.3.11-4 Scenic Integrity Objective Designations in the Vicinity of Non-federal Lands**

| Tract                    | Adjacent/Nearby SIO Designations                                              |
|--------------------------|-------------------------------------------------------------------------------|
| 1 – Hay Lake Lands       | High, Moderate, Low                                                           |
| 2 – Lake County Lands    | Moderate (Lake County South); Low, Moderate (Lake County North)               |
| 3 – Wolf Lands           | Low (Wolf Lands 2, 4); Low, Moderate (Wolf Lands 1); Low, High (Wolf Lands 3) |
| 4 – Hunting Club Lands   | Moderate                                                                      |
| 5 – McFarland Lake Lands | High                                                                          |

#### **4.3.11.2.4 Tract 1 – Hay Lake Lands**

##### **Recreation**

Tract 1 exhibits evidence of recreational activity. Several trails cross the parcel, including trails that intersect with County Road 715; most of these trails are either bermed or gated and some have posted No Trespassing signs. Hay Lake and Rice Lake are accessible by canoe on the Pike River. Deer and evidence of bear were observed, as were two deer stands (others are believed to exist) (Lisson and Gawtry 2011). A sand and gravel pit in the northeastern portion of the parcel show evidence of use as a shooting range and/or hunting site. A boat landing and small parking area (not listed or mapped as a MDNR access point) are present near the southeastern corner of the parcel on Rice Lake.

##### **Visual Resources**

Tract 1 covers 4,926.3 acres that contain three lakes (see Figure 4.3.11-1). This tract is crossed by County Road (CR) 175 and CR 135 (both of which are known as Pike River Road) and the Pike River. Tract 1 can be viewed from Pike River Road and nearby Pike Mountain, as well as the waterways within the tract. Tract 1 is roughly 3 miles north-northwest of Biwabik; however, the flat terrain prevents the tract from being viewed from the town. The portions of Superior National Forest surrounding this parcel generally have Low SIO designations, with some Moderate designations near the northeastern and southwestern corners, and High designations to the north.



***Figure 4.3.11-1      The Hay Lake Tract: Looking North along the Pike River***

#### **4.3.11.2.5 Tract 2 – Lake County Lands**

##### **Recreation**

The Tract 2 parcels all have very limited access. There is no evidence of recreational activity or hunting on any of these parcels.

##### **Visual Resources**

Tract 2 consists of four individual parcels, referred to as Lake County North and Lake County South, totaling 381.9 acres. The three Lake County North parcels are located southeast of Pine Lake and approximately 13 miles southeast of the federal lands, and are not visible from Pine Lake Road, the nearest public road. The portions of Superior National Forest surrounding these parcels have Low and Moderate SIO designations (see Figure 4.3.11-2). The Lake County South parcel is approximately 27 miles southeast of the federal lands. Due to flat terrain and the remote nature of the southern site, it is not visible from public roads or other public areas. The portions of Superior National Forest surrounding this parcel have Moderate SIO designations.



***Figure 4.3.11-2      Looking East from the Northwest Corner of Lake County North, Southern Sub-Parcel***

#### **4.3.11.2.6 Tract 3 – Wolf Lands**

##### **Recreation**

The Tract 3 parcels all have very limited access. A rough forest road provides access to Wolf Lands 3, and a trail accesses Coyote Creek. No trails were observed on any of the other parcels during site visits, and there is no evidence of recreational activity or hunting on any of the Tract 3 lands.

##### **Visual Resources**

Tract 3 consists of four separate parcels totaling 1,575.8 acres, and consists of level land containing wetlands, bogs, and forests. Wolf Lands 1 is located southeast of Pine Lake and may be visible from Nelson Road. The portions of Superior National Forest surrounding this parcel have Low and Moderate SIO designations. Wolf Lands 2 is due east of Greenwood Lake and may be visible from a private road to the east of the property. The portions of Superior National Forest surrounding this parcel have Low SIO designations. Wolf Lands 3 has recently been logged and may be visible from Forest Route 393 (see Figure 4.3.11-3). The portions of Superior National Forest surrounding this parcel have Low SIO designations, with a corridor of High SIO

land along the southeastern boundary. Wolf Lands 4 is visible from Forest Routes 103 and 393. The portions of Superior National Forest surrounding this parcel have Low SIO designations.



***Figure 4.3.11-3      The Wolf Lands, Looking Northwest along Coyote Creek***

#### **4.3.11.2.7 Tract 4 – Hunting Club Lands**

##### **Recreation**

Tract 4 is currently accessible via a private road. One trail passes close to the southern boundary of the site. There is no evidence of recreational activity or hunting on this parcel.

##### **Visual Resources**

Tract 4 is comprised of 160.2 acres and is approximately 50 miles northwest of the federal lands. It is level, remote, and surrounded by other forested lands (see Figure 4.3.11-4). There are no public roads leading into or directly around the parcel. Two small public roads are within 2 miles of the parcel but are screened from view by vegetation and terrain. The portions of Superior National Forest surrounding this parcel have Moderate SIO designations.



*Figure 4.3.11-4      Wetland on the Hunting Club Lands Parcel*

#### **4.3.11.2.8 Tract 5 – McFarland Lake Lands**

##### **Recreation**

Legal access to Tract 5 is limited to water access, although a private cart road exists at the edge of the property, as does a trail along the lake shore. There is no evidence of current recreational activity or hunting on this parcel; however, Tract 5 was previously owned by Wheaton College. A bunk house, fire pit, outhouse, and cistern (all unused and in disrepair) remain on site, indicating past use for recreational activities. All structures would be removed upon completion of the Land Exchange Proposed Action.

##### **Visual Resources**

Tract 5 encompasses 30.8 acres situated on the western shore of McFarland Lake (see Figure 4.3.11-5). The parcel is visible from the northern, eastern, southern, and portions of the western shore of McFarland Lake. County Road 74 and Woolys Bluff run along the southern and southeastern perimeter of McFarland Lake, but are substantially screened from viewing the parcel due to vegetation and flat terrain. A limited number of lakefront homes, private piers, and a public access point on the eastern shore of the lake have views of the McFarland Lake property. The portions of Superior National Forest surrounding this parcel have High SIO designations.



**Figure 4.3.11-5      *McFarland Lake from the McFarland Lake Tract***

### **4.3.12 *Wilderness and Other Special Designation Areas***

#### **4.3.12.1 Federal Lands**

##### **4.3.12.1.1 Land Exchange Proposed Action**

The federal lands of the Land Exchange Proposed Action are similar to the Mine Site previously discussed, but exclude the privately owned land bordering Dunka Road to the south of the Mine Site. Section 4.2.12.1 provides a discussion of the existing conditions on the federal lands.

##### **4.3.12.1.2 Land Exchange Alternative B**

The federal lands included in the Land Exchange Alternative B are similar to the federal lands in the Land Exchange Proposed Action. Section 4.2.12.1 discusses the existing conditions on the federal lands.

#### **4.3.12.2 Non-federal Lands**

The non-federal lands comprise five tracts (groups of parcels) assembled by PolyMet for the purpose of the Land Exchange Proposed Action.

##### **4.3.12.2.1 Tract 1 – Hay Lake Lands**

Adjacent cRNAs include the Pike Mountain and Loka Lake cRNAs (southwest corner and northeast corner of the tract, respectively). Pike Mountain is a 709-acre research area located on top of the Mesabi Range, characterized by old growth northern hardwood communities (sugar maple and red oak), paper birch forest, and rock/talus communities. The Loka Lake cRNA is part of an extensive peatland dominated by stunted black spruce and tamarack with interspersed upland islands (USFS 2011h).

##### **4.3.12.2.2 Tract 2 – Lake County Lands**

There are no wilderness or other special designation areas in or adjacent to Tract 2.

##### **4.3.12.2.3 Tract 3 – Wolf Lands**

There are no wilderness or other special designation areas in or adjacent to Tract 3.

##### **4.3.12.2.4 Tract 4 – Hunting Club Lands**

There are no wilderness or other special designation areas in or adjacent to Tract 4.

##### **4.3.12.2.5 Tract 5 – McFarland Lake Lands**

This tract includes lakefront property on McFarland Lake, an entry point to the BWCAW. Access to the property is available by water from a landing off County Road 16 (Arrowhead Trail) approximately 10 miles north of Hovland, Minnesota. While near the BWCAW, this tract is located outside the BWCAW boundary. There are no other wilderness or other special-designation areas in or adjacent to Tract 5.

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#### ***4.3.13 Hazardous Materials***

AOCs associated with contamination by hazardous materials from former activities and operations on the federal and non-federal lands are discussed in Section 4.3.1.

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#### ***4.3.14 Geotechnical Stability***

The Land Exchange Proposed Action does not include the creation or modification of geotechnical features. As such, the current geotechnical conditions at lands proposed for exchange are not considered relevant to the EIS. The existing geotechnical conditions underlying the NorthMet Project Proposed Action stockpiles that would be located on federal lands proposed for exchange are discussed in Section 4.2.14.

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